



# THE DOCK & HARBOUR AUTHORITY

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## Editorial.

### *De-rating of Dock Warehouses.*

Judgment has been given in a group of appeals concerning the question whether premises in the dock area of Liverpool and Bootle, occupied as warehouses, are entitled to be de-rated as freight-transport hereditaments. It had been held by a divisional court that grain warehouses occupied by the Grain Storage and Transit Company, known as the Alexandra Warehouses, are entitled to be de-rated. The divisional court had also given a similar ruling in regard to a grain warehouse at East Waterloo Dock, occupied by the Mersey Docks and Harbour Board. The Crown appealed against both these decisions. The Dock Board appealed against the divisional court's decision that the following Liverpool premises are not freight transport hereditaments and therefore not entitled to be de-rated:—Albert Dock warehouse, used for wine, spirits, tobacco and sugar; Wapping Dock warehouse, used principally for consignments of sugar and tobacco; Stanley Dock warehouse, used as a bonded tobacco warehouse; and a wool warehouse in Great Howard Street. The users of the warehouses contended that the premises are occupied and used partly for dock purposes as part of a dock undertaking, and that therefore they are entitled to be de-rated as freight transport hereditaments. The Crown took the opposite view, and alternatively submitted that they were excluded because they were "primarily occupied and used for warehousing merchandise not in the course of being transported." In all seven cases the Court upheld the decisions of the divisional court. All the appeals were dismissed with costs.

### *Melbourne Harbour Trust.*

The Melbourne Harbour Trust Commissioners have just issued their 54th Annual Report being for the year ended 31st December, 1930.

The total receipts for the year amounted to £742,358 7s. 4d., and after certain deductions, left net receipts of £629,457 4s. 1d., this being a decrease of £156,713 18s. 3d. over that of 1929. The expenditure for the year was £1,040,752 10s. 5d., and after certain deductions, left a net expenditure of £897,130 13s. 6d., this meant an expenditure over receipts of £267,673 9s. 5d.

The total trade of the port for the year was 3,894,289 tons, this being a decrease over that of 1929 of 970,002 tons or 20 per cent. Imports totalled 2,637,538 tons, being a decrease of 711,057 tons over that of 1929 or 21 per cent., and exports were 1,256,751 tons, a decrease of 258,945 tons on that of 1929 or 17 per cent.

### *New Harbour Works at the Port of St. John, New Brunswick*

Work on the development of the Port of Saint John, N.B., is likely to be pushed forward in the near future following the arrival of a large quantity of contractors' equipment. This equipment is to be used on excavation work within the coffer dam protecting the large area at West Saint John where about £1,000,000 is being spent on the initial undertakings to provide the harbour with a great new ocean pier, a large grain elevator, conveyor galleries to handle the grain to ocean steamers, new transit sheds, etc. Completion is expected shortly of the new 1,500,000 bushel grain elevator as well as the car dumping shed in the centre of the railway yards, from which point the grain will be conveyed to the elevator on belts travelling some

800-ft. The plans of the Saint John Harbour Commission include the construction of immense new railway yards and the development of numerous industrial sites. Much of the new equipment has been brought from the Welland Ship Canal now practically completed.

The coffer dam constructed on the site of the new pier and slips is reputed to be the largest of its kind in the world, being necessary in order to hold back the immense pressure of the Bay of Fundy tides. Excavation is being carried 35-ft. below the low water mark of the harbour and no less than 67-ft. below the nearest street level. The pier is to be 850-ft. in length at first and later on will be lengthened to 1,250-ft. Eventually three new piers and slipways will be available in the harbour, each providing a minimum of 35-ft. of water. The Canadian National Railways will secure direct access to the West Saint John docks by a bridge constructed directly across the harbour, thus the new terminals will be equally accessible to both trans-continental railways, West Saint John being one of the Eastern terminals of the Canadian Pacific Railway and the winter port of the Canadian Pacific steamships on the Atlantic route.

### *Glasgow "Civic and Empire" Week.*

During the "Civic and Empire" week celebrated at Glasgow at the beginning of June many townspeople and visitors eagerly availed themselves of the special facilities offered of exploring the local docks and harbours and thus obtaining some useful knowledge of their working arrangements.

A book specially prepared for the "week" and entitled "Book of Glasgow," contained as one of its special features an article by the General Manager of the Clyde Navigation Trust—Mr. James MacFarlane—which was widely quoted in many newspapers and periodicals. Mr. MacFarlane has received many cordial congratulations on his masterly exposition of the activities of the Port of Glasgow, and it is universally admitted that his contribution to this book was one of outstanding importance.

In the introductory paragraphs in Mr. MacFarlane's article, he deals generally with the question of civic progress and port development as going hand in hand. "When civic progress and port development go forward hand in hand in a great city such as Glasgow," writes Mr. MacFarlane, "it is only fitting that, when reviewing the city's municipal greatness, some contribution should be made in regard to Glasgow's port and its important relationship to the prosperity of the city and Scotland in general. It is difficult to fully assess the value of the part played by a great port in a city's advancement; that it constitutes one of the most important factors is not to be doubted. The trade of any great city or locality is (in these days in particular) bound up with, and to a large degree dependent upon, efficient transport; and the interests of ports and transport of every class are indissolubly allied for the simple reason that the one cannot thrive without the other. No matter how well equipped it may be—without its shipping services linking it up with all parts of the world, and its inland rail and road connections for the expeditious collection and distribution of the commodities it handles, no port undertaking can prosper; whilst, on the other hand, transport systems (whether steamship, rail or road) find in the ports mediums through which directly, and indirectly, they obtain a large bulk of trade."

## Hull and the Humber

### Parliamentary Fight over the Humber Bridge Bill.

**T**HE Parliamentary fight over the Humber Bridge Bill is proving one of the longest and most expensive in the history of port and dock affairs of the Humber. It has been estimated that the cost to all parties during the hearing before the Select Committee of the House of Commons will be not less than £200,000 and may possibly approach a quarter of a million sterling. The strongest possible opposition has been manifested by the Humber Conservancy Board whose expert advice has led them to the conclusion that the construction of the proposed road bridge across the Humber in the vicinity of Hull is fraught with the greatest danger to channel of the river and freedom of navigation. Sir Lynden Macassey, K.C., the leading Counsel for the Conservancy Commissioners, stated that the opponents of the scheme were under the greatest apprehension that as a result of natural influences the main navigable channel of the river may be diverted from the point where the main span of the bridge is proposed to be constructed and that the bridge may create new conditions in the river which may have one or all of three possibilities, viz: the diversion of the main navigable channel from under the main span, irreparable injury to the deep water channel outside Hull, and (or) serious silting near the fish docks at Hull. Counsel asked the Committee to say that they were not satisfied that there were any grounds for the theory that nature will for all time stabilise the channel on the north side of the site of the proposed bridge, and contended that when the piers of the bridge are constructed on the Lincolnshire side there would be every possibility of scouring, which would take the form of deepening the passage between the piers, thus scouring out the bottom of the river. In brief, the Conservancy Commissioners intimated that they could not accept any responsibility for what might happen to the regime of the Humber if the bridge were built.

Technical evidence was given by Captain A. E. Butterfield, chief engineer of the Humber Conservancy, who provided a chart made in 1832 showing a sandbank 900-ft. long at the site of the bridge and large enough to fill the main opening of the bridge. He stated that he saw no reason why the conditions which obtained a hundred years ago should not obtain again sooner or later, as it was reasonable to assume that the cycle of change was taking place over a long period. Capt. Butterfield expressed fears for the Hull docks by short-circuiting if the bridge were built. He added that the structure would impede the tide and thus form dangerous eddies. The Humber, he said, is in one respect unique, in that it contains more material in suspension than any other river of the United Kingdom. Moreover, because of its great area, sea conditions are often produced and wind also severely felt. The channels of the Humber also vary: below Hull they are fairly stable and above Hull very shifting and vary from day to day. These shifting channels have to be surveyed daily and buoyed off. So often are there changes that the average number of times navigation lights are moved during the year is 43. In 1922 there were 85 changes necessary, and he had been, Capt. Butterfield added, quite unable to assign any cause. The navigable channel post, he also said, was continually changing and had been 25 years on the south side of Read's island and 19 years on the north. Capt. Butterfield, emphasising that it was vital that the deep-water channel above Hull should be preserved, said that there were two dangers. The first was the possibility of the flood tide breaking through the Skitter sand across the South Middle and so short-circuiting the Alexandra Dock, the King George Dock and the oil installation at Saltend, which is absolutely dependent upon deep water; and the second the development of the ebb channel from Barton Sand towards the Hull Middle and Skitter Sand and so short-circuiting the Fish Docks, the Albert Dock and Hull itself.

Important evidence was also tendered by Mr. Henry A. Reed, consulting engineer to the Manchester Ship Canal, who expressed the opinion that the piers of the bridge would have the effect of lengthening the Hessle Sand to the extent that it might interfere with the channel at the Hull fish docks. Mr. Reed drew an analogy between the Severn and the Humber. At the site of the piers of the Severn bridge, he said, there had been from time to time enormous scouring, and it had been necessary to dump large quantities of stone there. Drastic changes in the channels of the Severn had occurred, notably in 1908. The only railway bridges over navigable rivers at all comparable with the proposed road bridge over the Humber were those over the Severn and the Tav. If the channels in the Humber moved in the same way as the channels of those rivers after the bridges had been built, it would spell

disaster to the Humber and those who used it. There would be the further difficulty in the Humber if the main channel moved, that the head room would be entirely insufficient at the side spans. Mr. Reed did not agree that there was no possibility of the main channel shifting at the site of the bridge; it had done so before and there appeared no reason why it should not do so again.

### No Additional Pilots for the Humber.

The efforts of the Humber pilots to secure the re-opening of the question of additional pilots, have thus far been unavailing, the Humber Conservancy Board having confirmed a recommendation of a committee that, having regard to the present state of shipping they are satisfied that no case has been made out for increasing the personnel of the pilots. In addition to this the Pilotage Committee of the Hull Chamber of Commerce have unanimously decided to oppose the appointment of any more pilots, and moreover are strongly of opinion that the exemption limit of coasting and home trade boats should be raised and the number of pilots correspondingly reduced in order to put the Humber on the same basis as other ports.

### New Member of the Humber Conservancy Commissioners.

Sir John Marsden has been elected by the Grimsby ship-owners to represent them on the Board of the Humber Conservancy Commissioners vice the late Mr. A. Bannister.

### Clean Bill of Health at Humber Ports.

The success of the efforts of the Hull and Goole Port Sanitary Authority to check the inflow of infectious diseases and maintain a clean bill of health at these ports is indicated by the fact that in the past twelve months no ship containing any evidence of plague, either in human beings or rats was reported. Generally the incidence of disease on incoming vessels was less than the average of previous years and there were no cases of cholera, yellow fever, or typhus. The rats destroyed during the year on ships and on the docks numbered 8,515 as compared with 8,203 in the preceding period. Dr. J. Yules has reported on a rat-flea survey undertaken for the purpose of ascertaining the infectibility or otherwise of Hull with bubonic plague. The survey indicates that Hull has a low index figure and that if a plague-infested ship arrived in port during the winter months the plague would not spread. The only months in which there might be a danger of plague spreading were from July to early October.

### New Marconi Station for India.

As a part of the development plan for Bedi Port, Kathiawar, India, a Marconi coast station for communication with ships at sea is to be installed to the order of the Port Commissioner, Lieut.-Commander Bourne, R.N.

Bedi Port is under the jurisdiction of His Highness Jam Sahib Shri Ranjitsinhji Vibhaji, who is keenly interested in the progress which is being made in this "Liverpool of Kathiawar," and the new coastal wireless station will be fitted with the latest type of Marconi marine equipment. The order has been placed through the Indian Radio Telegraph Company, Ltd.

The equipment will comprise a Marconi Type M.C.13 transmitter of  $1\frac{1}{2}$  kilowatts power and the new Marconi Type 352 receiver. Operating on the interrupted continuous wave system, the Type M.C.13 transmitter incorporates the latest developments of valve transmission and is designed to meet all the requirements of modern telegraph services at sea. It is arranged to transmit on any wavelength between 600 and 800 metres. The Type 352 receiver is a highly selective and efficient instrument covering the exceptional wave range of 15 to 22,000 metres.

### Manchester Ship Canal Traffic.

According to the monthly traffic return of the Manchester Ship Canal Company, the receipts from traffic in May on the main waterway were approximately £91,625, representing a decline on the corresponding month of last year of £9,277. For the five complete months of the year the revenue has been approximately £462,258, which is less than for the same period of last year by £59,121. As a consequence of the reduction of traffic, certain departments have been put on short time. Really the figures for the two periods are not comparable, as de-rating only came into operation in October, 1929.

## The New Sydney Harbour Bridge



*View looking West, showing progress of Main Span Deck Erection.*

The new Sydney Harbour Bridge now under construction for the New South Wales Government, by Dorman Long and Co., Ltd., is the largest arch bridge in the world. This bridge, which will cost about £6,000,000, consists of a central arch span, 1650-ft. long, across the harbour and five approach spans at each side, the total length being 3770-ft., while included also are abutment towers flanking the main arch at either end, rising to a height of 285-ft. above the mean sea level. About

37,000 tons of steel have been used for the main arch alone, which at the highest point is 437-ft. above the high-water level with also 12,000 tons for the approach spans. The main arch is also to carry the heaviest deck ever constructed, being 159-ft. 6-in. wide, taking 4 lines of electric railway 4-ft. 8½-in. gauge, a road 57-ft. wide, and 2 footways each 10-ft. wide, while the headway for shipping under the deck is 172-ft. 6-in. at high water, reducing to 160-ft. near the harbour foreshores.



*View looking South-East, with Cradle being lowered from Hanger. Orient liner passing underneath.*

## Italian Harbour Affairs

### **First Signs of Improvement at Italian Ports.**

**T**HE passenger and goods traffic at Italian ports during May last, according to official figures just published, has considerably improved as compared with the previous month, but have not reached the level of May last year. Good imported and exported in May totalled 2,843,678 tons, as against 2,726,489 tons in the previous month and 3,071,762 in May of last year. The share of Italian ships was respectively 1,775,962 tons, 1,612,806 tons and 2,038,326 tons. The passenger traffic totalled 719,699 against 702,462 and 739,958, and the share of the Italian flag was 708,589, 691,795 and 725,809 respectively. The share of Italian ships in the goods traffic increased on all routes, and that of foreign ships diminished in the traffic with North Europe, South and Central America and Australia.

Goods arrived at Genoa by sea during May last totalled 480,025 tons against 430,177 tons in the previous month, and 501,395 tons in May of last year. Coal traffic was respectively 199,124 tons, 199,080 tons and 181,487 tons; wheat 77,374 tons, 25,553 tons and 57,897 tons. The arrivals from Russia amounted to 15,787 tons against 6,617 tons and 942 tons. Maize amounted to 19,338 tons, arrived from the Plata, against 16,676 tons and 19,784 tons; cotton to 10,674 tons against 10,881 tons and 13,446 tons; mineral oils to 28,391 tons against 31,299 tons and 34,957 tons, and iron and steel scraps to 5,344 tons against 4,744 tons and 13,651 tons. Figures concerning goods shipped for oversea countries are not yet published.

For the first time this year the monthly figures of goods traffic in the Port of Trieste were in May last better than any other month in comparison with the corresponding month of last year. The total traffic in May last, by rail and sea, totalled 3,832,979 tons as compared with 3,816,622 tons in May, 1930. This increase was caused by the arrivals by sea, totalling 1,543,164 tons (against 1,320,358 tons) and by consequent increase of departures by rail 1,203,441 tons (against 1,049,815 tons). Notwithstanding this improvement, the goods traffic for the first five months of this year totalled 17,484,715 tons against 19,443,814 tons in the corresponding period of last year. The arrivals by sea amounted to 7,031,573 tons against 6,974,388 tons, and the departures by rail to 4,805,618 tons against 4,382,377 tons.

Also in the Port of Fiume an increase of about 3,000 tons of goods was registered in April last as compared to the previous month, notwithstanding a decrease of about 1,000 tons in exports.

### **Traffic at Italian Ports.**

Goods landed and loaded at Italian ports during the first months of this year totalled 13,211,280 tons, as compared with 15,051,184 tons during the corresponding period of last year. The share of the Italian flag to this traffic, that is including coastwise, was 62.45 per cent. of the total in May last, against 59.13 in April last and 66.35 in May of last year.

Goods transported by the Italian State Railways for private companies during the period January to May of this year totalled 17,926,752 tons, against 22,318,877 tons in the corresponding period of the previous year.

The cereal traffic has more than doubled in the Port of Venice during the first four months of this year, totalling about 72,000 tons against about 35,000 tons. Noticeable increases of cereal arrivals was also registered in other Adriatic ports and especially at Bari (more than 37,000 tons against 7,010 tons); at Ancona (about 13,000 tons against 9,000 tons); and at Fiume (about 3,000 tons against only 592 tons). This increase is caused especially by the increase in the purchase of Russian cereals by Italy; cereals that are more conveniently landed at Adriatic than at Tyrranian ports.

The arrivals of cotton at Venice decreased by about 4,000 tons during the first four months of this year, totalling more than 14,000 tons, but a considerable decrease was registered in the arrivals from North America (from 44 to 42 per cent. last year) and a noticeable increase in the arrivals from Egypt (from 23 to 27 per cent.) and from British India (from 25 to 29 per cent.). The arrivals from other countries are very limited.

The traffic in the Port of Cagliari, the most important in Sardinia, has considerably increased in recent years, totalling 534,000 tons last year against about 400,000 tons during the best pre-war years. About three-quarters of the traffic is absorbed by the coastwise trade, in which there is included 150,000 tons of salt. Among the arrivals from abroad there have been about 80,000 tons of coal per year and considerable quantities of cereals, timber, fertilizers and colonial goods. Among the goods loaded for foreign countries there have been mineral ores, charcoal and cheese. The facilities of the port are con-

siderably improved. An expenditure of three-and-a-half-million paper lire has been made recently for new cranes, two of which are used for discharging coal and one for loading salt. Work on new wharves and basins, for an industrial zone near the port are at present under construction. The passenger traffic averages about 24,000 per year. Nine regular lines, including those subventioned by the Italian Government, connect the Port of Cagliari with the most important ports of Italy and of the world.

### **Genoa Works and Traffic.**

At the general meeting of the Administration of the Port of Genoa, the President of the Board of Directors, Marquis Federico Negrotto Cambiaso, demonstrated that the construction of the basin " Benito Mussolini " will require an expenditure of about 125,000,000 paper lire of which about 54,000,000 lire are already spent.

The first section of this new basin will be finished in 1932 and the second in 1933, but the works are progressing in the two sections during the present year. About 700,000 cubic metres of stones have been carried away from the hill of San Benigno and used for the construction of new piers. Some other piers have been lengthened and improved.

Some special works are considered necessary and urgent for the purpose of putting the port in a position to receive the two Italian super liners " Rex " of Navigazione Generale Italiana (that will probably be launched on July 19th) and " Comte di Savoia " of the Lloyd Sabaudo, under construction at Trieste.

The most important of these works are the lengthening of the dry dock, which was completed on June 20th, and required an expenditure of about 7,000,000 paper lire, the cutting of the " Molo Vecchio " (old pier) for which an expenditure of 2,700,000 paper lire was already made, and another 1,000,000 paper lire will be required, and the transformation of the Andrea Doria Pier from a pier for landing and loading goods, to a pier for loading and landing passengers.

This transformation will be finished in June, 1932, and will require an expenditure of 5,200,000 paper lire (excluding the share that will be paid by the largest steamship companies) of which about 1,500,000 paper lire have already been spent. The Administration of the port has also contributed 3,815,000 paper lire to the construction of the present aerial port.

The committee formed last year to study the best means of distribution of traffic in the port after the new basins are in operation is making good progress. This new distribution will be made by berthing ships in such a position as to avoid changing wharfs for landing or loading different qualities of goods.

The tariffs for coal discharge have been decreased from a minimum of 11.42 to a maximum of 17.5 per cent., according to operations, and the means used for the same operations. Considerable reductions have been contemplated for other goods notwithstanding the consequent decrease in the port authority revenues. Some facilities have been granted to the State Railways and to other great administrations for the landing and deposit of coal in the port.

Signor Federico Negrotto Cambiaso pointed out that the traffic in the port during last year decreased about 9.17 per cent. The figures for the first five months of the year are as follows, according to the Port Authority Bulletin:—

		1931	1930
Goods arrived (tons)	...	2,405,865	2,640,653
Goods loaded	...	360,457	416,773
Bunkers	...	231,805	224,268
Total	...	2,998,127	3,280,694

The passenger traffic decreased in the same period from 68,887 to 59,448, arrivals totalling 29,529 against 32,834 and departures 29,919 against 35,553. Only in the bunkering traffic has a considerable improvement been registered during this period.

The Consiglio Provinciale dell'Economia of Genoa has considered commencing as soon as possible negotiations with the Genoa Municipality, and the Genoa Port Authority (Consorzio Autonomo) for the improvement and enlargement of the Free Zone of the Port (Deposito Franco) on the site named " Molo Vecchio." According to the Consiglio the warehouses of this zone are not near the ships and have not the necessary facilities for landing and loading operations and are entrusted to private companies. The cost of depositing in these warehouses is consequently very high and puts Genoa in a disadvantageous position regarding competition with other Italian and foreign markets, especially regarding such products as coffee, sugar, Colonial goods and olive oil.

## Mechanical Transport for Dock Use

In that branch of transport where distances are measured in yards rather than in miles, where, for example, it is a question of moving material from the quay to the shed, or through to the railway siding, the conditions necessary to ensure economical handling demand an intermittent system of conveyance.

A representative in this group of handling apparatus that has come to the fore of late is the battery-driven electric truck the development of which has progressed so rapidly during recent years that the range of usefulness of these machines is now very considerably extended. This fact should have particular interest to dock authorities who are frequently called upon to meet peculiar difficulties in the matter of handling and transporting materials.

The electric truck appears in two forms—as a self-contained truck or as a tractor or locomotive drawing a train of trucks. Its construction is comparatively simple, and the power of the driving motor and the capacity of the storage battery can be proportioned to the work required. If continuous service, or continuous readiness to serve is required throughout the 24 hours, it is easy to arrange for rapid replacement of a discharged battery by a charged one. The running cost of the truck is small and a boy can become a competent driver after an hour's instruction.

The claim that the electric battery truck is an essential link in the mechanical handling of material receives strong support in its increasing use both by shipping and industrial concerns throughout the country, the former utilising it for dockside work, the latter for transporting goods in and around the factory. Before giving some typical working examples a few details concerning the design and operation of the electric truck may be of interest.

### Variety in Special Designs.

These trucks are made in a number of designs, according to the particular nature of the work for which they are intended. There is the low-loading platform type with its platform about 11-in. from the ground, while other designs give a platform height up to about 2-ft. from the ground. Then there is the elevating platform truck which lifts its load on a stiltage just far enough off the floor to allow safe clearance and leaves the load where required. Another type is the tier lift, which will carry its load to a height of several feet without difficulty, while the barrel-lifting truck is fitted with a special attachment for handling large barrels in addition to the usual load on its platform. Again, there are electric trucks fitted with cranes for unloading from wagons, or other lifting purposes.

The method of drive from these trucks is usually by means of a small totally-enclosed series wound motor of the reversing type, with a rating of about 1½ b.h.p. being transmitted from the motor through worm gear and differential to the wheels.

The motor receives its current from a battery under-slung on the truck frame, and these trucks are usually designed on flexible lines for the accommodation of the battery so that any battery can be supplied to meet the buyers requirements. A drum reversing type controller, giving three speeds in either direction forms the control, and the steering acts on the pair of wheels next to the driver's platform.

The charging of these batteries is by direct current and should the supply available be alternating current, it must be converted into direct current by a motor generator set, a rotary converter, or a mercury arc rectifier; of the three methods the motor generator set is generally considered the best.

The operating cost of an electric truck, including wages of driver and all capital charges, operating expenses and depreciation, varies from about 20s. to 25s. per day, depending upon the conditions of service. As much as 30 tons per shift of 8½ hours has been dealt with by one of these trucks—loading capacity 35 cwt.—the number of hand barrows required for the same work would approximate six.

With the aid of trailers an electric truck is capable of handling a cart load at one haul, and this method can be frequently used with advantage, as much labour is saved and the load removed completely in one operation. Moreover, the trailers can be loaded while the tractor is engaged elsewhere on hauling work.

One of the latest examples of the application of these trucks is to be found at the new Tilbury landing stage of the Port of London Authority.

For the conveyance of passengers' baggage from the ships to the Customs room, and from the arrival platform at the station to the boat, a fleet of eight 1-ton battery electric trucks has been provided, a suitable garage and charging station having been erected on the floating stage for the accommodation of these vehicles.

D. P. Kathanode batteries of 16 cells, and 300 amp. hr. capacity, are fitted to these vehicles, each of which has a load platform measuring 77-in. by 45-in.

These trucks have carried on one journey 16 tons of luggage in 13 runs from the train platform to the quay side, a distance of about half-a-mile in the short time of 20 minutes. They have been designed to negotiate a ramp 168-ft. long, having a maximum gradient of 1 in 7½, the incline varying with the state of the tide. Previous to the installation of these trucks hand lorries were employed. It took about seven porters to operate one hand lorry, so that one of these battery electric trucks may be said to do the same work with one driver as that which was previously accomplished by seven men.

The trucks were built to a specification issued by the London Midland and Scottish Railway Co., in which it was stated that each truck was to be capable of carrying a load of 1 ton on the level at a speed of not less than 5 m.p.h. and climbing a gradient of 1 in 7½ at a speed of not less than 1½ m.p.h. The capacity of the motors fitted to these vehicles and the battery is such that the truck can work continuously for two hours climbing and descending the gradient above-mentioned without undue heating.

The whole of the electrical equipment of these vehicles is in accordance with the appropriate B.E.S.A. specification, and particular care has been taken to provide a controller of substantial design, easily accessible for cleaning, and having all working parts capable of simple independent renewal. Series-parallel control is provided for by means of the controller, and the control of the brakes so arranged that if the truck is left without a driver the current is automatically cut off and the brake applied.

The speed on the level when running empty is 6½ m.p.h. and when running at loaded capacity 5½ m.p.h. These handy little vehicles will ascend a gradient at 2½ m.p.h. when empty and 1½ to 1¾ m.p.h. when loaded.

Liverpool provides another good example of the application of electric trucks for transporting, elevating and stacking.

From West Toxteth Dock Sheds, Liverpool, Elder, Dempster and Co., Ltd., clears over 200,000 tons of imported produce per annum, and a big proportion of this total is hauled from the ship's side by electric trucks, of which a fleet of 22 is in commission. Besides these machines, considerable use is made of other modern cargo-handling plant, including a battery of thirty 5-cwt. portable electric cranes, which have proved most useful for the speedy loading of motor and horsed lorries with goods which, for the time being, have been stored in the sheds on the dock quay.

There is also in use an electric truck incorporating a new attachment for elevating and stacking miscellaneous goods, such as bagged produce, barrels and bales of cotton.

Some of the trucks are equipped with a patent cask handling gear and a detachable patent bag, bale and case handling gear; the cask gear is fitted at the control end of the vehicle, leaving the platform space clear. The towing gear is fitted at the platform end to avoid damage to the special attachments in case the load being towed over-runs the truck. The purpose in providing the special gear is primarily to eliminate the time lost in loading and unloading the truck by hand labour.

Other trucks are fitted with the pronged attachment and are employed at each hatch of the ship, and after the bag produce has been landed on the quayside it is sorted out according to the mark of the particular merchant to whom it belongs, then it is weighed in drafts of five on a scale fitted with a rotating platform on which are fastened a number of wood battens, 4-in. by 3-in. section. The bags are then marked with the weight. The tractor now drives in with the prongs underneath the bags, and picks the whole draft off the scale in seven seconds, and transports them to the pile. Here the driver depresses a pedal, and the bags slide off into position on the ground. The whole process is speedy, and most of the heavy work previously associated with this class of cargo is eliminated.

In another case, logs of mahogany weighing from one to ten tons are towed from the ship's side after discharge to a timber scale sunk in the ground, and after weighing are further towed to the storage area.

At Victoria Docks of the Port of London Authority a fleet of twenty-four 2-ton battery trucks are employed for cargo handling and it is interesting to note that many of these trucks have been in constant use from 10 to 14 years without giving the slightest trouble.

Electric trucks also play a prominent part in the conveyance of the cargo handled in East and West India and Millwall Docks. Here a fleet of twenty 2-ton trucks have been in continual use since 1923. At each of these docks battery-charging stations have been installed where the trucks are charged up during the night.

Finally, we have the Southampton Docks of the Southern Railway Company where a fleet of electric battery trucks deal with the handling of cargo.

## *Development of the Hudson Bay Railway and Shipping Route*

**T**HE following memorandum, containing information published from time to time by the Dominion Department of Railways and Canals, contains most of the outstanding facts relative to the conception and development of the Hudson Bay Railway and Shipping Route:

### *The Hudson Bay Railway and Shipping Route.*

The work of completing the Hudson Bay Railway, the construction of which had been suspended during the war, was resumed in 1926. Before the cessation of construction, track had been laid to the second crossing on the Nelson River at Kettle Rapids, about 90 miles from Port Nelson, at which point it had been originally decided to establish the terminal. The railway had therefore only been in operation up to Mile 214, which is 113 miles south of Kettle Rapids Bridge. During the period following the closing down of construction, the track had fallen into such a condition that railway operation was impossible until much money had been spent on rehabilitation.

### *Abandonment of Port Nelson.*

In view of the difference of opinion as to the relative merits of Churchill and Nelson as the ocean terminals, it was decided that before going on with the project an investigation should be made of the respective merits of the two ports. Sir Frederick Palmer, of the well-known English engineering firm of Messrs. Rendel, Palmer and Tritton, who was consulted by the Government in October, reported strongly in favour of the abandonment of the line to Nelson. He favoured the construction of a longer line from the Kettle Rapids Bridge to Churchill, where the new port would be constructed in preference. At Churchill he considered that accommodation could easily be provided to admit 28-ft. draught vessels during 24 hours each day during the season of navigation.

### *Equipment Transferred to Churchill.*

On the decision of the Government to establish the terminal at Churchill, steps were taken to transfer from Port Nelson such equipment and material as could be usefully employed at the new port. Much of this was taken north by lighters and tugs or by motor tractors operating along the shore of the Bay. A quantity of material, furthermore, has been sent to Churchill by sea from Canadian Atlantic ports. During the 1927 and 1928 seasons efforts were concentrated on the building of dredging equipment and the transportation thereof to Churchill; the provision of temporary docks, camps and workshops, etc.

### *Opening of Railway Communication in 1929.*

Since the completion of the steel track to Churchill early in 1929, trains have been running in order to provide transportation in the area covered by the route. No commercial occupation of the town has been permitted owing to the lack of accommodation there for any except those engaged on work connected with the railway itself; the town-planning, water supply, sewerage, etc., at Churchill; the construction of the port equipment; and similar functions. During the winter of 1930-31 a fortnightly limited railway service has been provided, 213 men being engaged on winter maintenance and operation.

### *Port Facilities at Churchill.*

The season of 1930 was the second period of actual work in the harbour and during the two seasons 988,000 cubic yards of dredging were completed. The roundhouse was completed at the terminal; sewer, water and steam pipes and electricity supply laid to all buildings; and yard track raised to proper levels; the numbers employed ranging from 125 to 1,289 during the season.

Work was begun during the 1930 season on the construction of the grain elevator, and a test shipment of two or possibly three cargoes of grain amounting to about 750,000 bushels is expected to leave Churchill for Europe in the middle of September, 1931. The port is, however, not expected to come into regular use until the opening of navigation in 1932.

The spring tide at Churchill varies between 14 and 16-ft., and neap tide is 12½-ft. At high tide the depth of water at the dock will be from 43 to 46-ft., and at low tide 30-ft. The anchorage in the harbour has a depth of 33 to 50-ft. at low tide, while the entrance has a depth of from 60 to 90-ft. and is 1,000-ft. wide.

The dock is situated on the eastern shore of the harbour, about a mile south of Cape Merry, which is the tip of the eastern peninsula enclosing the harbour, and the southern side of the harbour entrance. The length of the dock is about 1,850-ft., and its direction is parallel to the general direction of the shore line. When completed, the dock will have a surface width of 250-ft. for a length of 500-ft., and a surface

width of 300-ft. or more for the remainder of its length. Immediately in front of the dock it is expected that dredging will be carried to the full depth in 1931. A comparatively small amount of dredging in the approach channel will permit vessels drawing 22-ft. of water to reach the dock, and this dredging will be completed in 1931. The additional dredging called for will permit vessels of 28-ft. draught to pass through the approach channel, and tie up at the dock at low tide.

The grain elevator, constructed of reinforced concrete, is being erected on a line parallel with the face of the dock, but 600-ft. back on the landward side, the site being approximately at the low tide line. The elevator is to have an ultimate capacity of 10,000,000 bushels, but the first unit will be capable of storing about 2,500,000 bushels, there being provision also for the drying of grain where necessary. Grain will be delivered from the elevator to the deep water dock by a four-belt conveyor system. The gallery along the dock will be about 1460-ft. long to provide berthing for three grain boats under the gallery spouts. Twenty-three boat spouts will be placed about 65-ft. apart, and it will be possible to discharge four streams of grain into ships at the rate of 20,000 bushels an hour for each stream. Under conditions of maximum operation the elevator will be able to unload at the rate of 400 car loads daily.

The facilities to be provided at the port include also cold storage capacity for approximately 40,000 tons; storage for cattle and lumber; as well as terminal sheds with an approximate total storage capacity of 40,000 tons.

Electric power for the grain elevator, dock facilities and municipal services at Churchill will be generated by a modern steam-electric power plant to be built in the neighbourhood of the elevator. As already mentioned, the complete port equipment will not be available until 1932, but 870-ft. of wharf are expected to be ready on September 1st, 1931, with a depth of water alongside of 30-ft. By the date mentioned it will be possible for two boats to lie at the wharf and three at anchor in the outer harbour. The initial limited grain elevator facilities will probably not be available before the 15th September, 1931, when it will be practicable for one ship to load and one additional ship to lie at the wharf.

In addition to the salvage equipment of the icebreaker "McLean," the ocean-going tug "Ocean Eagle" is available at Churchill. She has been specially strengthened for ice work, and is fitted with 12-inch salvage pumps and accessories. Ships entering and leaving Hudson Strait will be able to obtain continuous bearings from Direction-Finding Stations at Resolution, Hopes Advance and Nottingham, and in addition thereto assistance from the icebreaker "McLean." Beacons have been erected on Esquimaux Island at the entrance to the Harbour, as well as on Cape Churchill and at other appropriate points.

### *Municipal Services at Churchill.*

Churchill is 600 miles north of the City of Winnipeg, and its northerly latitude has made it necessary to find a solution to numerous problems not hitherto met with in Canadian municipal development. Special study has been made of water supply, sewerage, central heating and other problems, but the laying-out of the town-site has been actively pushed forward by officials of the Government of Manitoba.

### *Hudson Bay and Strait.*

Hudson Bay, including its southerly extension in James Bay, measures nearly 1,000 miles from north to south and 600 miles from east to west at its greatest breadth, the total area being about 576,000 square miles. Hudson Strait is about 500 miles in length, and has an average width of over 100 miles. The entrance to Hudson Strait is in approximate longitude 64 degs. 30 mins. west, whilst Churchill Harbour is in longitude 94 degs. 30 mins. west, being farther west in fact than the limit of navigation on the Great Lakes-St. Lawrence system.

The Hudson Bay coast for some twelve miles eastward from the mouth of the Churchill River is composed of rocky cliffs not particularly high, fronted in places by several fine sandy beaches and broken by two deep bays whose shores are low and swampy. The inland country is low and made up of muskeg and gravelly ridges containing a maze of freshwater ponds and lakes. The soil a few feet below the surface is perpetually frozen to a great depth, though from three to four miles back from the shore there is a growth of scrubby spruce trees.

A great deal of useful information in connection with the navigation of Hudson Bay and Strait was secured by an aerial survey conducted by the Department of Marine at three points on Hudson Strait, the reconnaissance being carried on in 1927

**Development of the Hudson Bay Railway and Shipping Route—continued**

and 1928. As the result of the information obtained by these expeditions steps will be taken by the Marine Department to establish at appropriate points in the Strait various modern aids to navigation, including direction-finding devices which will be of invaluable assistance to navigation in northern waters.

Much still remains to be done in order to secure an absolutely reliable estimate of the period during which navigation is commercially practicable both in Hudson Bay and in Hudson Strait. In addition to the fact that navigation has been in progress for 200 years, Canadian Government expeditions have established that it is possible to add materially to the safety factor by providing modern aids to navigation such as wireless direction-finding stations, lights, icebreakers and fuel bases therefor. During the 1929 season of navigation the first vessel which passed through to the Bay experienced practically clear water from its entry into the Strait on July 23rd until the ship reached Chesterfield Inlet on August 4th. A few days later, a number of ships not specially protected against ice passed safely through, occasional icebergs being seen on the northern side of the Strait, as is customary along the St. Lawrence route at the same time of the year. Outward-bound, the last ship to leave the Bay and Strait cleared from Churchill on October 14th, reporting no ice until she left Resolution Island on November 1st. The only casualty reported during the season was the loss of a small schooner as the result of a fire in the engine room.

**Railway to Open-up Mining Country.**

The Hudson Bay Railway itself, which has been built through a territory believed to be richly mineralised and containing also belts of land suitable for agriculture, is 510 miles long, extending from The Pas, Manitoba, a town 483 miles from Winnipeg. Access from Winnipeg to The Pas is gained by a circuitous route via Hudson Bay Junction, Saskatchewan, and many proposals are under consideration the object of which is to shorten the journey from Winnipeg to Churchill.

**Advantages of Hudson Bay Route to Europe.**

The advantage of the Hudson Bay Railway and steamship route, as compared with those connecting western Canada with Europe via Vancouver and the Panama Canal or via Fort William and the Canadian or American Atlantic ports, lies in the short rail haul involved and the cool ocean trip. The latter factor is expected to be important from the point of view of the dairying and stock-raising industries. What the reduced rail haul means in practice may be inferred from the following figures showing the distance from the principal points in central Canada to Churchill, as contrasted with Montreal:—

	Churchill All Rail Miles	Montreal All Rail Miles	Montreal, via Great Lakes Miles
Winnipeg ...	993	1,357	1,633
Portage la Prairie ...	938	1,412	1,689
Brandon ...	937	1,492	1,767
Regina ...	843	1,713	1,990
Moose Jaw ...	886	1,756	2,082
Saskatoon ...	847	1,828	2,133
Edmonton ...	1,146	2,158	2,464
Calgary ...	1,246	2,260	2,466

The distance to Winnipeg from Minneapolis, an important centre of the United States grain business, is 453 miles, and it is evident that if the Hudson Bay route were ever used for the transportation of northern United States products a saving in mileage similar to that gained by western Canada might reasonably be expected.

The distance from Churchill to Liverpool is 2,936 miles; from Montreal to Liverpool, 2,760 miles; from Winnipeg to Liverpool via Hudson Bay the distance is at least 500 miles less than via Montreal; and from Edmonton to Liverpool over 1,000 miles less than via the Great Lakes. As a concrete illustration, it may be stated that the distance from Saskatoon to Fort William is 904 miles and from Fort William via the Great Lakes to Liverpool 3,974 miles—a total of 4,878 miles. By the Hudson Bay route the distance from Saskatoon to Churchill will be 847 miles and from Churchill to Liverpool 2,936 miles—a total of 3,783 miles, or a saving of 1,095 miles, the actual rail haul being less by 57 miles.

**Cost of Construction estimated at £10,900,000.**

The anticipated total capital cost of the Hudson Bay Railway, together with the Churchill terminals and grain elevator, is as follows:—

	\$
Hudson Bay Railway ...	32,639,460
Churchill Harbour and Elevator ...	14,161,000
Port Nelson Terminals, abandoned ...	6,274,217

Total Estimated Capital Expenditure ... \$38,074,677

Continental interests may find of service the following facts regarding distances from Montreal, Churchill and Vancouver to various points on the European Continent:—

	Via Belle Isle Strait	Via Cape Race	Lat <sup>o</sup> 45 2' 3" North via Long 50 West
Montreal, Rimouski (Father Point)			
to Ushant ...	2,472	2,575	2,607
to Cape Wrath ...	2,305	2,518	2,589
Port Churchill to Ushant ...	3,071 (via 75 miles S. of C. Farewell)		
" to Cape Wrath ...	2,795 (via 75 miles S. of C. Farewell)		
Vancouver to Ushant (via Juan de Fuca Str. Active Passage Panama and Colon and Mona Passage)			8,477
Ushant to Havre ...	... ...	... ...	235
" Antwerp ...	... ...	... ...	437
" Rotterdam ...	... ...	... ...	440
" Hamburg ...	... ...	... ...	689
" Copenhagen (via Kiel Canal) A	... ...	... ...	910
" Copenhagen (via Kiel Canal) B	... ...	... ...	870
" Gothenburg (via Kiel Canal)	... ...	... ...	913
" Gothenburg (via the Skaw)	... ...	... ...	872
" Copenhagen (via the Skaw)	... ...	... ...	971
Cape Wrath to Gothenburg (via the Skaw)	... ...	... ...	541
" Copenhagen (via the Skaw)	... ...	... ...	653
" Hamburg ...	... ...	... ...	600
" Rotterdam ...	... ...	... ...	549
" Antwerp ...	... ...	... ...	614
" Havre ...	... ...	... ...	681

NOTE.—(a) Via track for vessels over 22-ft. draught.

(b) Via track for vessels under 22-ft. draught.

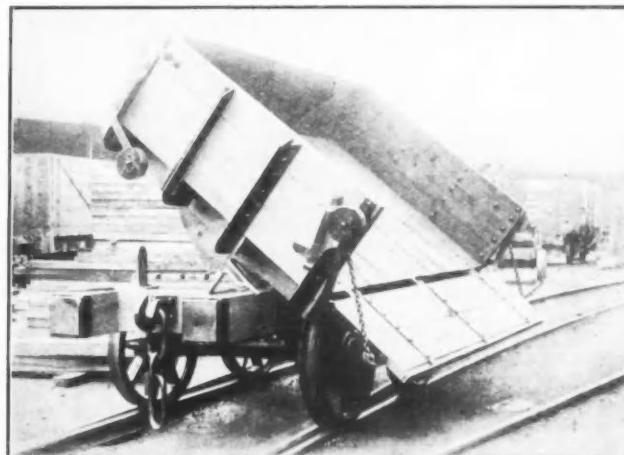
**Harbour Works at Churchill, Manitoba.**

According to the "Canadian Engineer" (Toronto), of April 28th, the second crew of men who will work on the erection of the two-million bushel grain elevator at Churchill, Manitoba, will soon be on their way to the northern sea port. Two million dollars worth of building material is being assembled for this particular portion of the harbour facilities, and 30 trains of 40 cars each will be required to move the steel, cement and general equipment from Winnipeg to the port.

The contractors have sub-let several sections of the construction work to other companies, but they are making arrangements to employ 1,000 men at Churchill before July 1st. The Churchill elevator will be the most modern of its kind.

**New Design of Manchester Ship Canal Side Tipping Wagon**

After an outstanding record of success with their M.S.C. Standard Type Side Tipping Wagon, The Cambrian Wagon Company Limited, Cardiff, now inform us that they have designed an Either Side M.S.C. Tipping Wagon. For simplicity of operation and real time saving, this wagon is absolutely bound to give satisfaction. It is specially designed for use in any position to tip either side. That's why it is so economical. The carrying capacity is 4½ cubic yards, 4-ft. 8½-in. gauge.



The Either Side M.S.C. Tipping Wagon.

Constructed of elm throughout, the overall dimensions are:—

	ft.	in.
Length over buffers ...	12	5
Length of body inside ...	9	8
Width of body inside ...	6	0
Depth of body inside ...	2	0
Total height of wagon above rails ...	6	8½
Wheelbase ...	4	6

There is little doubt that such a wagon is needed and will replace the original One Side Tipping for future requirements.

## Port of Southampton Topics

### Sailings to be Cancelled by Shipping Companies.

THE news that the principal shipping companies operating on the North Atlantic passenger route have decided to cancel a number of sailings during the present summer and autumn, has serious consequences for three or four of the big ports in the kingdom, but especially so for Southampton which is the premier passenger port, and is the British terminal for the express service to New York.

Although the companies have not all made an official announcement as to the exact number of cancellations, it is estimated that altogether forty voyages, some of them by the world's largest liners have been struck out of the sailing schedules. The express services maintained from Southampton by the White Star and Cunard Lines will be affected, and the other principal passenger-carrying companies, including the Canadian Pacific, Hamburg-Amerika Line, North German Lloyd, and the Compagnie Generale Transatlantique will also to some extent amend their sailing schedules.

The position which has arisen is unprecedented in the annals of trans-Atlantic shipping. The news perhaps was not altogether unexpected in shipping circles, where the depressed state of the shipping industry has been apparent for some time, but it has come as a bombshell to the man in the street, and will represent a substantial loss in trade in many directions.

It is only in the summer months that the really large liners can be run at a profit. In previous years tens of thousands of Americans crossed the Atlantic to spend their vacations in Europe, but this year there has been a marked change. The big ships which have arrived in recent weeks have been carrying little more than half the totals they boasted a year ago, and the bookings for future voyages are very low.

Faced with the possibility of losing money by operating their vessels at a loss, the shipping companies have, not unnaturally, endeavoured to find the best way out, and after deliberations both at the North Atlantic conference and among themselves, they have decided on this scheme of cancellation.

The most regrettable feature of the cancellation, so far as Southampton is concerned, is that four of the world's largest liners figure in the list of voyages which have been struck out, namely, the Cunards "Berengaria" and "Mauretania," the White Star Liner "Homeric," and the North German Lloyd Liner "Columbus." The "Homeric" and the "Columbus" each have three voyages out of the Atlantic schedule, and the Cunard also have three cancellations of "express" liners, the "Mauretania" being affected twice, and the "Berengaria" once.

With regard to the "Homeric," it is understood that, although that vessel will be off the Southampton-Cherbourg-New York service for two voyages in October, she will be employed in short cruises to Nassau. These she will commence upon her arrival in New York after her west-bound crossing on September 16th.

Among the ships affected by the cancellation are "Tuscania," "Caronia," "Carmania," "Homeric," "Empress of France," "Cleveland," "Berengaria," "Samaria," "Carinthia," "Columbus," "Mauretania," "Reliance."

This list is complete so far as the Cunard Line, the North German Lloyd and the Hamburg-Amerika Line are concerned, but the cancellation of certain voyages from Liverpool, which it is understood the White Star Line decided upon has not been publicly announced. The Canadian Pacific are somewhat similarly placed. The Holland-America Line have issued a statement, that, in view of the satisfactory position of their passenger traffic, they have as yet no intention of cancelling any sailings. The United States Lines representatives in this country have received no information of altered plans.

### Numerous Decreases in Statistics for May.

The cancellation of sailings from Southampton, the general trade depression, and the fact that fewer Americans are visiting Europe than in previous years, all played a part in bringing about numerous decreases in the Southampton Dock statistics for the month of May.

The number of vessels inward in May dropped from 384 to 312, a decrease of 72, whilst outward the total dropped from 378 to 314, or a falling-off of 64.

The gross tonnage figure fell from 1,874,309 to 1,438,401 inward, and from 1,849,646 to 1,549,512 outward. The total loss of tonnage was, therefore, 435,908 inward and 300,134 outward.

With regard to net tonnage, the fall was 248,483 inward and 176,400 outward. The respective aggregates were 761,711 inward this May, as against 1,010,194 in the corresponding month last year, and \$17,228 outward, as compared with 993,628.

In cargo there was a decline of 5,812 tons inward, and 8,610 tons outward. Inward the total was 45,533 tons, against 51,345 tons, and outward 34,925 tons, as against 48,535 tons.

The passenger business of the port also slumped, the arrivals dropping from 22,934 to 18,861, and departures from 19,982 to 16,847. The decline inward was, therefore, 4,073, and outward 3,135.

There were no trooping movements in May, 1930, but 1,353 troops arrived last month.

### New Line Calls at Southampton.

The service to Southampton recently opened by Messrs. Elder Fyffes has resulted in a number of their vessels making their first appearance at this port, and there is promise of considerable business in the future.

Another development taking place which will be watched with interest concerns the Compagnie Generale Transatlantique. Quite recently they sent one of their cargo vessels, the "San Antonio," to this port to discharge fruit, and another vessel, the "San Diego," discharged a big consignment of fruit here, from Tampa, before going on to Havre.

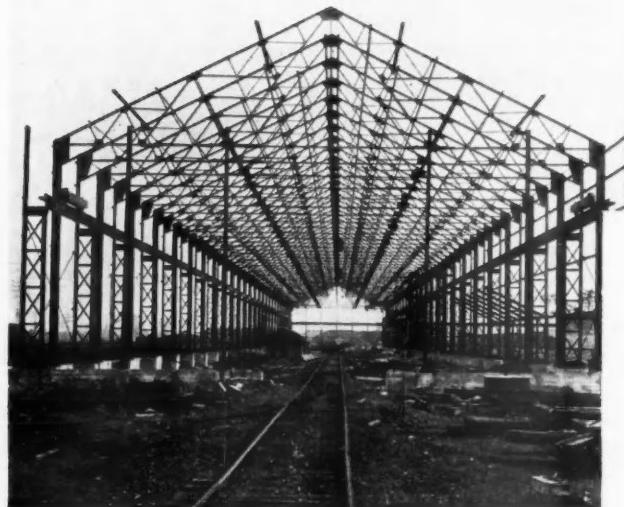
The C.G.T. is one of the notable competitors in the American trade. There are upwards of a hundred vessels in the fleet which includes some of the best-known ships on the Atlantic. They call at Plymouth and are based on Havre. Their cargo services are extensive, and it will be a welcome move if the freight steamers are frequently diverted to Southampton. At one time there was a strong possibility that their chief transatlantic service would make Southampton a port of call. The idea was that the fast ships should come to Southampton, and land passengers for this country before proceeding to Havre with Continental voyagers. So far that plan has not materialised, and in the present state of things in the Atlantic trade, a move of that sort can scarcely be expected now, but it is permissible to hope that one day the big French liners may be seen here. Meanwhile the cargo vessels make a welcome addition to the activities of the port.

### Vickers-Armstrongs, Ltd.

Mr. F. C. Yapp, who has for many years past been associated with Vickers-Armstrongs Ltd., was appointed a member of the Board of Vickers-Armstrongs Ltd. as from the 18th June.

### Messrs. Pearson and Knowles Engineering Co., Ltd.

In our June issue there appeared on page 14 an advertisement for Messrs. Pearson and Knowles Engineering Co., Ltd., Warrington, Lancashire, in which was shown a photograph depicting a steel building in course of erection at the Page-Hersey Tube Works, Ontario; but we are informed that the picture shown was incorrect, as this building was a low temperature carbonisation plant at East Greenwich.



The photograph now shown herewith is the correct one and shows the steel building which is in course of erection at Ontario.

## North-East Coast Notes.

### Bunkering Russian Traders.

THE opening of the seasonal Russian timber trade has had some benefit for the North-East Coast, for it has improved the bunkering trade there, especially on the Tyne and at Blyth. The facilities for bunkering in the area are excellent and vessels are assured of expeditious loading. So far, about 72 steamers have been chartered by the Soviet authorities for Leningrad and Archangel, and of that number 31 have been bunkered in the Tyne and 15 at Blyth, a total of 46; others also are expected.

Considerable quantities of North-country coal are being shipped to Port Said to re-stock the coaling station there, and in connection with the despatch of the fuel there was a rather noteworthy piece of work on the Tyne in the latter part of May. The Anchor-Brocklebank liner "Manipur," which generally is engaged in the general cargo trade, was commissioned to take a cargo of bunkers to Port Said and went to the Tyne for loading. In four days she received her cargo of 11,200 tons, as well as an ample supply of fuel for her own furnaces, leaving the river with about 12,000 tons aboard.

### Meeting of the Tyne Commissioners.

At a meeting of the Tyne Commissioners on June 16th a letter was read from Mr. E. Shinwell, Minister of Mines, in regard to the complaint laid before him by Mr. H. P. Everett, Chairman of the Commission, and Mr. Blacklock, the Secretary, as to the state of the coal trade on the North-East Coast. Mr. Shinwell stated that in his opinion the root cause of the decline in volume of British coal exports lies in the reduced demand for coal, consequent upon the present depression in business activities of almost every kind throughout the world. Great Britain, he said, has had to face increasing competition from other coal exporting countries; in particular, Polish coal has made considerable inroads into our foreign markets. Mr. Shinwell pointed out that the coal industry abroad had been considerably developed since the war, and now there was a large margin of surplus capacity in the major coal producing countries of Europe. In conclusion he emphasised that his chief hope for the prosperity of the British coal trade in the future was an international marketing agreement. There were many and formidable difficulties to be overcome before this could be realised, but he had done what he could to stimulate the interests of the British coal trade.

The scheme to construct new coal shipping staiths was referred to, when it was reported that a joint meeting of the Docks and Trade and River Works Committees had before them proposals for the construction of staiths at the West end of Northumberland Dock and an extension riverwards of the existing staiths belonging to the Hartley Main Collieries Co., Ltd., at a total estimated cost of £85,600. The matter was referred to the chairman, deputy chairman, and ex-chairman of the board, and chairmen of the standing committees, for consideration. The coal and coke shipments were down so far this year one and a-half million tons on last year, the May shipments being 1,119,952 tons, or 406,715 tons less than May last year. It was satisfactory to note that the vessels laid up had been reduced by five, and the tonnage from 249,140 tons in April to 241,842 tons in May.

### Smart Wear Loading.

The s.s. "Orvieto" has had a quick turn round in the South Docks, Sunderland. The vessel arrived in dock from dry-dock at 2.30 p.m. on Friday, May 29th, commenced to load at Nos. 1 and 2 coal belt conveyors at 3.30 p.m., and between that hour and 7.30 p.m. on Saturday night took 5,400 tons of cargo and 500 tons of bunkers, sailing at 3.30 a.m. on Sunday, having only been in dock about 36 hours.

### Review of Wear Trade.

The imports to the Wear during April showed a welcome increase of 5,000 tons, the total being 27,848 tons, compared with 22,836 tons in April, 1930. For the first four months of the year, however, there was a considerable drop, the figures being 92,173 tons in 1931, compared with 144,016 tons in the previous year. The details for the four months are as follow:—

#### IMPORTS

	Total, 1930	Total, 1931
	Loads	Loads
Timber	24,326	11,976
Grain	2,854	2,316
Esparto	8,340	6,549
Iron Ore	21,250	13,228
Cement	3,549	5,107
Petroleum	31,601	33,995
Wood Pulp	2,563	819
Iron and Steel	6,521	2,514
Sundries	12,255	17,506

The Wear general exports for the four months showed a marked decrease, the total being 20,483 tons, compared with 31,656 tons in 1930. The details are:—

#### EXPORTS

	Tons, 1930	Tons, 1931
Machinery	4,477	1,878
Iron and Steel	1,161	1,342
Pitch	12,622	9,489
Creosote	4,082	—
Petroleum	6,884	5,546
Sundries	2,480	2,228

While the Commissioners return of coal and coke shipments for the four months of 1931 show a 7 per cent. decrease, the coke shipments are not only well maintained but show an increase of 39 per cent. on the previous year. The appended details of the coal trade will be interesting:—

	1930 Tons	1931 Tons	Increase or Decrease Per cent.
Germany	222,900	148,150	33 dec.
Netherlands	55,660	58,605	—
Belgium	30,001	32,775	10 inc.
France	205,400	191,620	7 dec.
Italy	90,400	45,360	50 dec.
Other Countries	233,137	215,750	7 dec.
London	560,090	551,329	2 dec.
Coast Ports	204,076	217,540	7 inc.
Total	1,604,664	1,401,129	9 dec.
<b>BUNKERS:</b>			
Foreign Voyages	58,675	77,648	33 inc.
Coastwise	31,135	28,060	10 dec.
Gross Total	1,691,474	1,566,837	8 dec.

### Lighthouse Changes.

In order to take full advantage of the conversion of Roker Pier Lighthouse to automatic working, the River Wear Commissioners have decided to have the lighthouse on the old North Pier lighted by electricity, and a machine is to be fixed in the lighthouse to work the fog bell when necessary, at an estimated cost of £330.

Owing to the construction of the New Deep Water Quay it is necessary to move the two tiers known as the Low Tier and White's Tier from the position they now occupy. It has been agreed that the tiers shall be laid on the North side of the river opposite their present position, at an estimated cost of £1,000.

### Ship Movements at Blyth.

At the May meeting of the Blyth Harbour Commission, Mr. R. M. Sutton, deputy chairman, who presided, in submitting a report of the sub-committee appointed to consider the movements of ships in the harbour, pointed out that the circumstances which render movement of ships necessary were not within the limits of the Commissioners' jurisdiction. So far as the accommodation is concerned for the loading and berthing of ships there is an ample margin. The Commissioners, however, having had the matter brought to their notice, and after investigation, are addressing communications to the various interests with a view to securing, if possible, more co-ordination.

The statement of shipments for the four months ended April 30th, with comparative figures for 1913 and 1930, are as follow:—

		Tons
1931	...	1,533,797
1930	...	1,730,193
1913	...	1,518,810

The figures for the four months show a decrease of 11 per cent. on 1930, but an increase of 1 per cent. on 1913. There is also an increase of 41,381 tons in April this year, as compared with the corresponding month of 1930.

### Trade on Tees-side.

The trade returns submitted at the June meeting of the Tees Conservancy Commission show that in May 14,490 tons of iron and steel were landed at Teesside ports, against 11,669 tons in April and 11,723 tons in May last year.

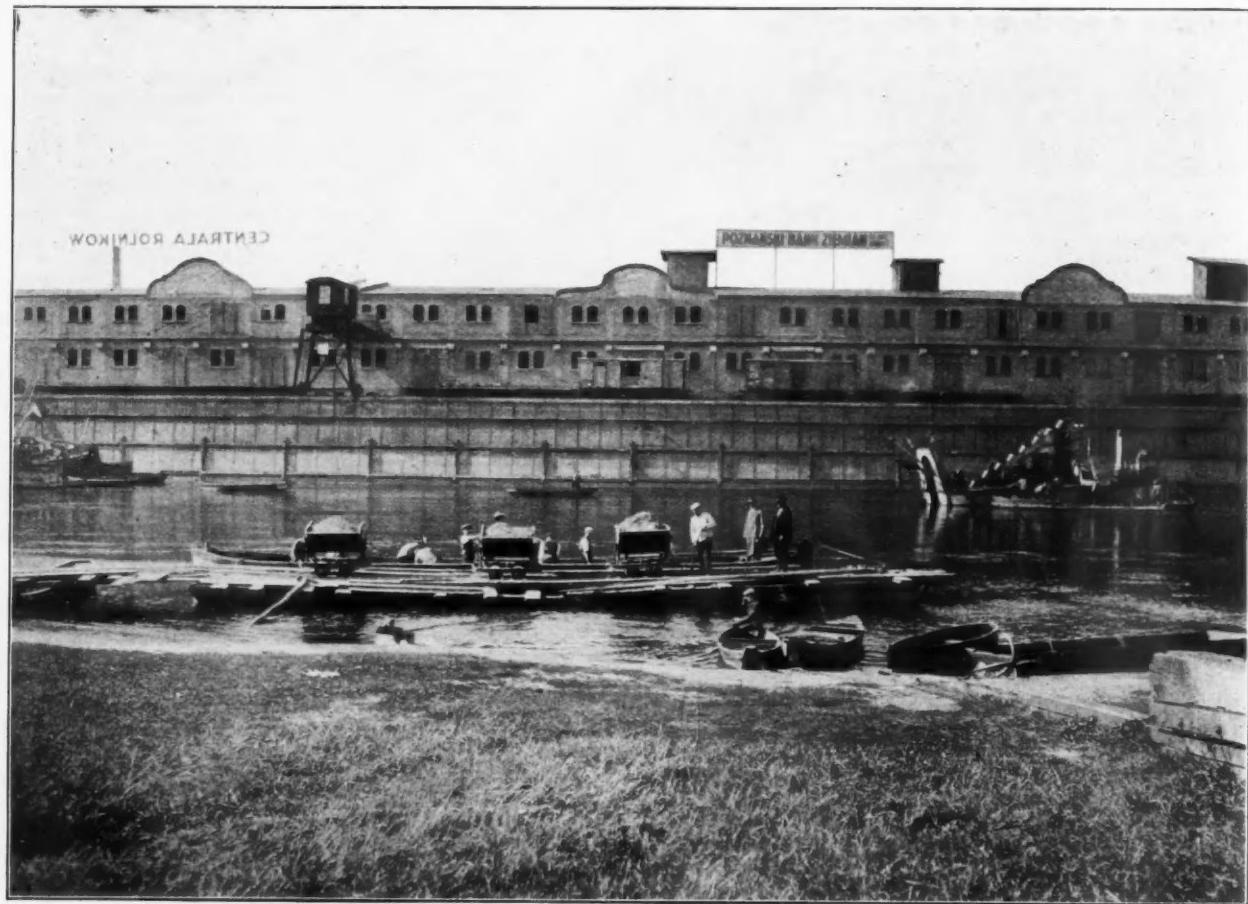
The import of pig iron reached 3,881 tons in May, compared with 1,337 tons in April, and 706 tons in May, 1930. In the past seven months 16,782 tons of pig iron have been discharged; of this amount 7,908 tons have come coastwise.

May shipments of iron and steel from the Tees were 9,500 tons below the April returns, the total being 48,148 tons.

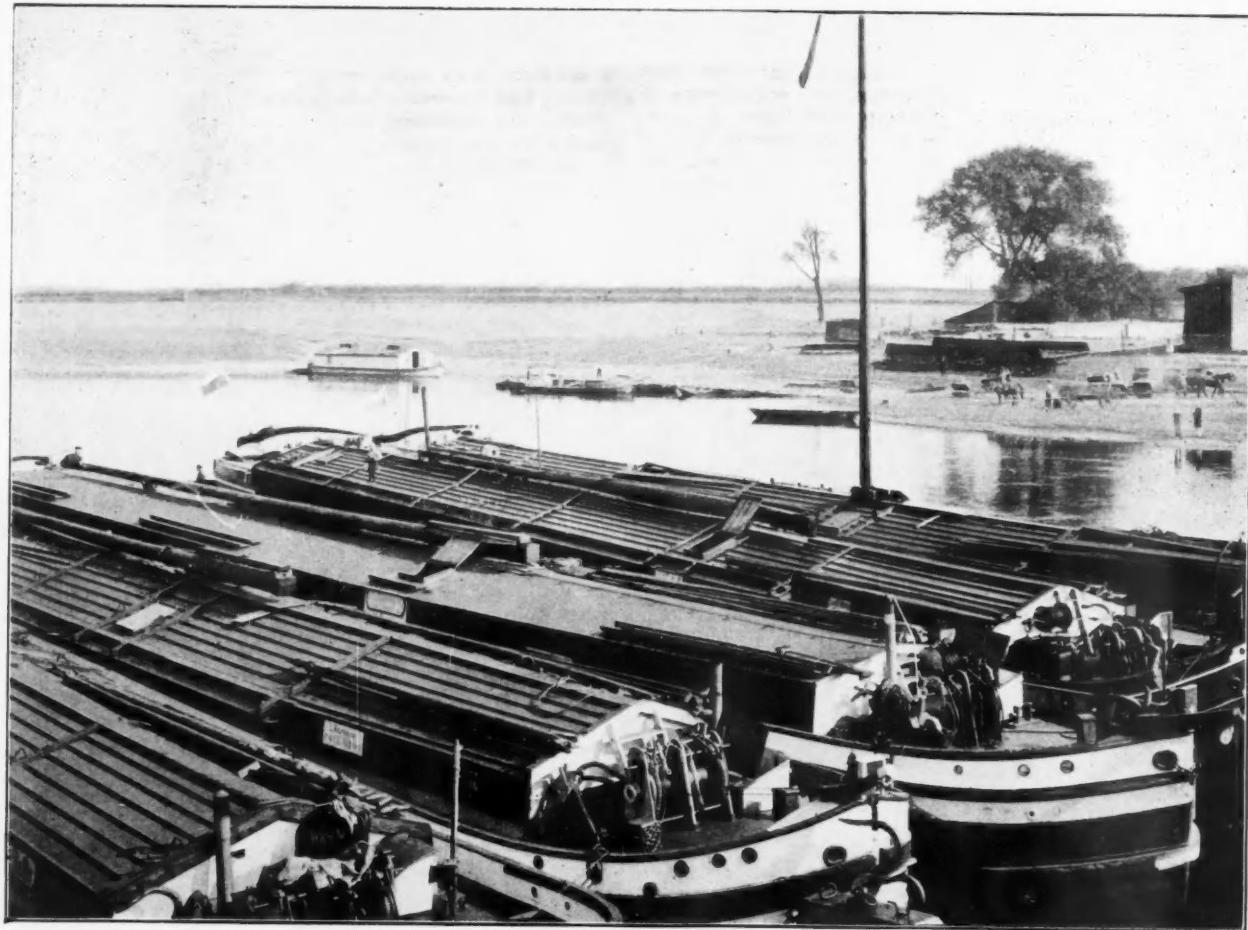
### Personalia.

Mr. C. Morgenstierne in June celebrated the 25th anniversary of his appointment as Consul for Norway in Newcastle. Speaking at an informal gathering at the Consulate on the occasion, Mr. Morgenstierne referred to the developments of the trade between this country and Norway during the past quarter of a century. "There is no doubt," said Mr. Morgenstierne, "that the River Tyne Improvement Commission have been largely instrumental in bringing this about by the provision they have made at North Shields with deep water quays and shipping facilities. That development is now seen in the inauguration of the fast Tyne-Norway service of the new motor ship 'Venus.'"

## *The River-Port of Poznan*



*One of the Storehouses and a Dredger at Work in the River.*



*Typical River Boats in the Port of Poznan.*

JULY, 1931

*The Dock and Harbour Authority.*

# *The River-Port of Poznan*

## *Its Connection with European Waterways*

By C. BIELENIA, Civil Engineer



*General View of the Loading Quay.*

In olden times men settled down on the shores of rivers and due to the insufficient number and bad condition of roads they made their voyages on natural waterways. The spacious net of mostly flat land rivers was the means of communication between the wide territories of ancient Poland. The present Polish Republic, although much smaller than it was, has about 10,000 miles of rivers, more or less navigable. A great deal of them have to be regulated and only small or middle-sized boats can ply on them at present.

Statistics for January, 1930, concerning navigation on Polish rivers and canals, are as follows:—

SELF-PROPELLING BOATS			BOATS WITHOUT ENGINES		
Total Number	Total Capacity in Tons	Total Horse Power	Total Number	Total Capacity in Tons	
166	6,137	15,609	1,882	116,275	

According to tonnage there are 1,818 boats of under 200 tons, 163 boats of 200-300 tons, 25 boats of 300-400 tons, 20 boats of 400-500 tons and 22 boats of over 500 tons.

The situation of the River Warta in the net of Polish waterways is shown on the supplement; of course, only principal rivers are shown. The Warta empties into the Oder, which discharges into the Baltic Sea at Stettin. The Warta, from the mouth up to Poznan, is navigated by boats of 600 tons, but further up, only boats of 250 tons can navigate. The depth of the Warta at Poznan is normally 7-ft. 6-in. The width of the river bottom in cross section is 105-ft., and the width of the normal (mean) water surface is 157-ft. The run-off (volume of water) of the Warta at Poznan at low water is 710 cubic feet per second, whilst normally it comes to 2,300 cubic feet per second, but by maximum high water it comes up to 58,500 cubic feet per second. The depth of water ranges from 1-ft. 10-in. under mean level to 18-ft. 10-in. above. During 270-295 days yearly the Warta is navigable, but during the rest of the year it is closed for navigation on account of the ice.

The City of Poznan is now the most important port on the Warta and perhaps the best arranged river-port in Poland. Shipping trade existed in Poznan from the oldest days, but until 1902 the loading and shipping were performed at the slopes of the shores by means of the simplest appliances. Owing to the steadily increasing importance of the city, greater and greater tasks fell upon the port, so that in the year 1901-

1905 the City Council decided to build a new loading quay 807 yards in length, which remains until to-day. The construction of the quay is composed of an almost vertical wall (steel joists and brick masonry) with land anchorage; the base of the wall is secured by wooden sheet piling. The edge of the quay is 20-ft. 4-in. above the mean water level and is out of reach of floods. There are railway tracks connected with the main railway station of Poznan, as well as several large store houses and sheds. The quay is equipped with 5 semi-portal cranes, each of which has 1.5 tons (29½ cwts.) capacity, 2 full-portal cranes each of 2 tons (39 cwts.) capacity, 2 wall slewing cranes each of 1.5 tons (29½ cwts.) capacity, 5 hoppers for unloading corn from railway cars into boats, 9 troughs for loading coal and 5 troughs for loading of sugar.

Owing to the remarkable improvement of loading equipment undertaken in the years 1901 to 1905, the port became much more attractive for shipowners and merchants. The yearly increment of loading traffic began to grow much quicker, than before the improvements were undertaken.

Year	Number of Inhabitants	Yearly Cargo Tons
1897	... 82,027	... 69,500
1900	... 117,033	... 71,500
1905	... 136,808	... 95,000
1913	... 164,418	... 216,000
1930	... 236,000	... 161,000

From 1897 to 1900 the average yearly growth of loading traffic amounted to 0.9 per cent., but from 1905 to 1913 it rose to 16 per cent. That means that from 1900 till 1913 the loading traffic increased to 200 per cent., but during the same time the population of the city increased only 40 per cent. Surely that gives clear evidence that the augmentation of the traffic of the port really depends very much upon its equipment and improvements.

During the war and the first years after the war a considerable reduction of traffic was noticed, as is shown herewith.

Year	Yearly Cargo Tons	Year	Yearly Cargo Tons
1924	3,420	1928	112,000
1925	25,300	1929	131,000
1926	102,000	1930	161,000
1927	99,000		

## The River-Port of Poznan—continued

Before 1914 the following goods were registered in the traffic of the port:—

Cement, pitch, pitch products, manure, steel, iron, herrings, corn, flour, bran, bones, chalk, oil-cakes, fodder, oil, rice, sugar, molasses, alcohol, potato-products, stones, fuel and timber wood, salt, coal, bricks and different small cargoes.

In the years 1924 to 1930 the following goods were registered: Coal, sugar, corn, rice, wood, manure, pitch and products of pitch, agricultural machines, stones and small cargoes of sundries.



*Electrical Full-Portal Crane of 39-cwt. capacity.*

First of all, in the last period, a reduction was noticed in the variety of cargoes, and moreover, records show that coal, sugar and corn (bulk goods), form about 90 per cent. of the annual traffic. Cargo handling in ports is much easier if there are only a few kinds of goods, and especially bulk goods allow the greatest efficiency of loading and transportation, as is well known. In the near future the amount of goods handled at the Port of Poznan will probably be more than 216,000 tons yearly, which is the hitherto registered maximum traffic of 1913.

According to this the yearly efficiency of quayage per yard can be easily calculated:—

$$\frac{216,000}{807} = 267 \text{ tons}$$

For comparison there are shown below figures concerning several German river-ports:—

	Tons Per Yard Yearly		Tons Per Yard Yearly
Kosel	642	Gustavsburg	276
Ruhrort	549	Magdeburg	219
Ludwigshafen	384	Mainz	147
Berlin	276		

Obviously the above numbers give evidence that the Port of Poznan can compete with any modern German port, excluding of course Kosel and Ruhrort, which are especially equipped for the steady export of coal. Probably the traffic would increase quicker, if the Polish Government was able to lower the railway rates for goods bound for the Port of Poznan. This port is very suitable for loading of bulk goods from railway cars into boats. Nowadays great quantities of goods, which are produced in the Polish coal district, respectively produced in Russia or Roumania, are transported by railway to German river-ports such as Kreuz, Steinau, Glogau, etc., where they are loaded into boats and forwarded on. All those transitive goods ought to go through the Port of Poznan, because this port is directly connected by a decent waterway with the seaports of Stettin and Hamburg and many German river-ports. As soon as the new German Mittellandkanal is opened, the Port of Poznan will moreover have a continual connection with rivers and canals of France, Holland and Belgium, as is shown on the supplement.

The City of Poznan does not merely represent a port for transitive goods; indeed, Poznan is rather a remarkable industrial city. Long before the war many factories, storehouses and warehouses were to be found here, for instance Poland's greatest factory of phosphate manure, factories of yeast, potato-product factories, soap factories, brick-kilns, distilleries, pitch product factories, sawing mills and many others. Now, of course, many other large factories appeared, such as H. Cegielski and Co., Ltd., whose products, especially locomotives, are sold in great quantities to Roumania and many other countries. Most of these factories use the waterway for transport and forwarding of raw materials as well as for the delivery of other goods.

The greater part of the loading quay is situated on the convex river shore, at which a steady settling of sand takes place. The owner of the port, i.e., the City Council of Poznan, supplies the money for the continual expenses for the dredging of the sandbanks. This and several other circumstances evoke the necessity of changing the course of the river within the boundaries of the city. In the meantime another task of great importance appeared, namely the question of the regulation of the high water flow. Finally the desired enlargement of the port has been considered.

After the insurrection of the independence of the Polish Republic, the City Council of Poznan gave much attention to hydro-technical problems. Namely, in April, 1928, the city engineers started to consider the regulation of the river, as well as the enlargement of the port. As the required maps and measurements are not yet quite completed, the work in question is in a preliminary state. Nevertheless the principal scheme is already drawn up as is shown on the supplement. The scheme consists of two parts; the commercial port and the industrial one. The commercial port is destined exclusively for transhipment of various goods and storage operations; because of the lack of larger territories the location and construction of factories here is impossible; it is the reverse with the industrial port, which will have spacious grounds for factories, so here must be situated special transporting plants for the great transhipment of bulk goods (coal, etc.); the location of great tipping and similar plants is not advisable at any other place than on special designated quays or piers.

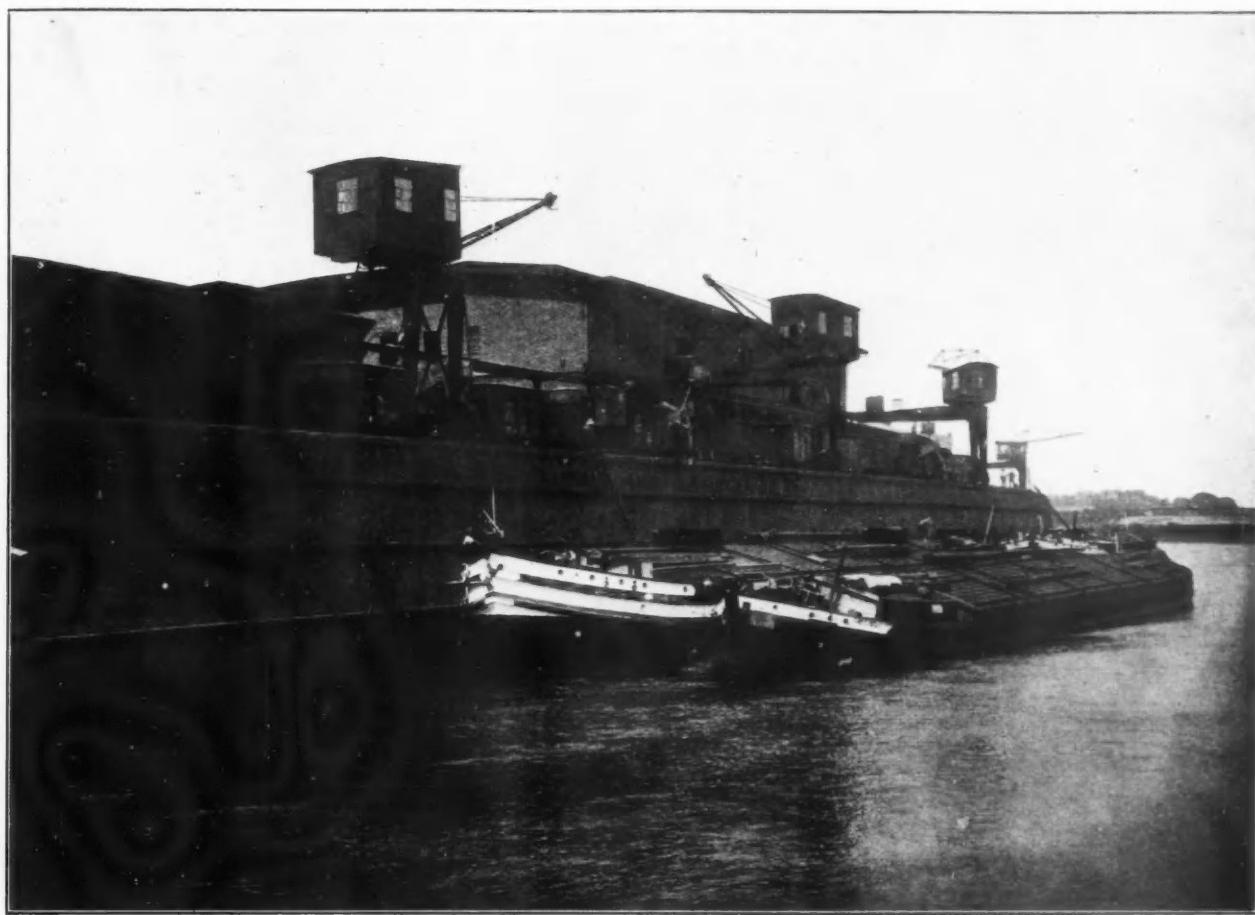


*Dredger at Work in the River.*

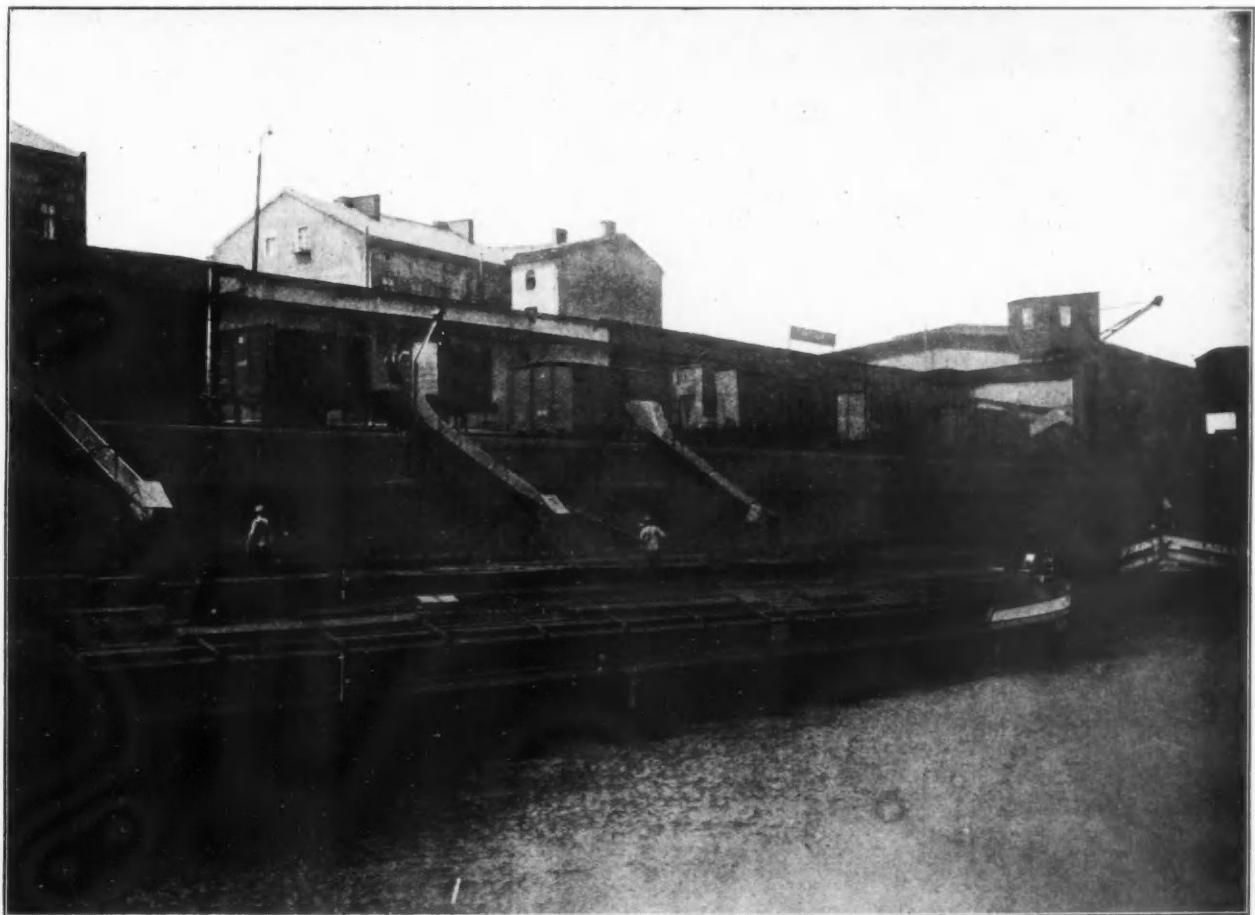
Such a division of the enlarged port in the future is very profitable in exploitation; moreover it is a very economical way of solving the problem, because it allows each part of the port to develop gradually according to rising demands. The general scheme of the situation and form of the basins, as well as the scheme of railway and road communications are in conformity with principles, stated in the resolutions of the XIV. International Congress of Navigation at Cairo, 1926.

As soon as the enlargement of the port is completed, the following port dimensions will be attained:—

## *The River-Port of Poznan*



*Transhipment of Corn from Barges to Railway Cars.*



*Transhipment of Coal from Railway Cars into Boats by means of Troughs.*

## The River-Port of Poznan—continued

1. About 9,900 yards of quayage out of reach of flood and fully equipped.
  2. About 4,950 yards of quayage flooded by water level 4-ft. 11-in. above normal.
  3. Certain amount of shores, suitable only for laying-up of ships.
  4. The total area of the water surface of the port about 125 acres.
  5. The total area of the industrial grounds about 55 acres.
  6. The total area of storage-buildings and places about 70 acres.
  7. A considerable area occupied by railway tracks.
- Supposing the average efficiency is 180 tons per yard yearly for quays out of reach of flood, and 45 tons per yard yearly for other quays, the probable total efficiency of the enlarged port can be calculated to be about 2,000,000 tons yearly.



Electrical Semi-Portal Crane of 29½-cwts. capacity.

The detailed scheme of the enlargement programme and the time of completion depends upon the increase of demands and the necessary money being available. The traffic, 2,000,000 tons yearly, at first glance seems to be too exaggerated, but the enlargement scheme ought to go forward, because it is quite necessary to secure the ground needed for enlargement; the port is situated within the boundaries of the city and if ground is not secured—surely they could be wrongly used by deliberate construction of dwelling houses, etc. Though at present the traffic of the port only shows 161,000 tons yearly, nevertheless, there is stated to be a steady and rather quick increase; there are many reasons to expect that increase will still go on. Indeed, a traffic of 2,000,000 tons is not a fantastic idea. It will become reality the sooner two further factors are in favour of the port, namely, a good share of the world market and a suitable tariff of railway transport rates. The colossal importance of those two factors is clearly shown by the following two years of the Strasbourg (Rhine) port traffic; namely, in 1913 the yearly traffic was 1,988,000 tons, but in 1927 the yearly traffic reached 4,331,000 tons; the reason of such an immense increase lay in the good share of market and protective railway fees of the French Government.

As was mentioned at the beginning of this article, the net of Polish waterways needs to be considerably improved, i.e., regulation of the rivers and construction of the new canals. The programme of those works is so colossal, that it can only be performed gradually, because of the high costs; especially the construction of canals which is a very expensive undertaking. Nevertheless, there are in Poland several tasks, which can and ought to be fulfilled; because the costs of construction are relatively low, however, those tasks are very advantageous. To that class belongs the designed construction of Warta-Goplo Canal, adjoining the River Warta from the town Konin with the Lake Goplo and further with the River Vistula (Wisla). As soon as this canal is ready and a supple-

mentary regulation of the River Warta towards Poznan is undertaken there will be a continual communication circle with connection to the Polish Baltic Sea ports—Dantzig and Gdynia (see supplement). The course of the designed Warta-Goplo Canal leads through several lakes (Goslawickie, Patnowskie, Mikorzynskie, Slesinskie), and represents a non-invested capital of the value of no less than £700,000; moreover, the Warta-Goplo Canal will serve at the same time as a drainage canal for 12,500 acres of marshy grounds in the environs of the town of Kramsk. The detailed plans are ready. According to them the Warta-Goplo waterway will contain only about 11 miles of artificial canal with two chamber-locks, and the greater part of this waterway runs through natural water (lakes). Henceforth the costs of Warta-Goplo Canal construction are estimated to be £350,000 only.

It is clear that the designed Warta-Goplo Canal has an immense importance for West-Poland and particularly for the Port of Poznan.

The navigation on the River Warta and the mentioned future Warta-Goplo Canal primarily could be exploited by boats of 200 tons capacity. Anyway, referring to British practice (Aire-and-Calder Canal) it would be possible to arrange for the navigation of boats of a capacity under 200 tons, as long as the River Warta toward Poznan is not regulated for larger boats. Indeed, it is well known, that on the Aire-and-Calder Canal great loads are transported by special water trains every one of which contains several small boats, each of 35-40 tons capacity; a yearly traffic 2,500,000 tons of coal was registered there shortly before the war.

A similar example can be found in France; a yearly traffic of 990,000 tons was registered in 1930 on the Canal de l'Ourcq, although this canal is navigable only by small boats of a maximum capacity of 60 tons.

Those two examples give evidence, that the navigation even of small boats can be of great importance.

The River Warta after its regulation as far as Poznan will be navigable for 400-ton boats to Konin. If the navigation of 600-ton boats should be desirable up to Poznan, then the construction of an artificial canal would be indispensable. This canal would be supplied with water of the River Warta and of several lakes. The construction of that canal would make available from the total head in environs of Poznan a water power of 4,000-5,000 h.p. The costs of the mentioned canal construction are calculated to be £1,280,000.

Concluding this article, concerning the description and real problems of the Port of Poznan the following remark should be mentioned: neither waterways nor ports ought to return immediate large percentages on invested capital. Indeed the aim of those investments is to facilitate the circulation of goods in the country, the abatement of costs of production and thus the enlargement of the consumption on the market.

## Kiel Canal Traffic, January to March, 1931.

There was a decline of 1,258 vessels and some 900,000 net register tons in the traffic using the Kiel Canal during the first three months of 1931 compared with the corresponding period of the previous year. The decline compared with the last quarter of 1930 was still greater, viz.: 4,456 vessels and some 2,100,000 net register tons. The figures were as follows:

	Jan.	1931	Feb.	Mar.	Total for 1st Quarter		
					1931	1930	1930
Total No. of Vessels	... 3,285	2,667	3,371	9,323	10,591	13,779	
Steamers or Motor Vessels	1,775	1,361	1,599	4,735	5,671	6,762	
Loaded	... 2,417	2,030	2,492	6,939	7,742	9,964	
German Vessels	... 2,382	1,928	2,561	6,871	7,812	9,975	
Tonnage of Vessels in 1,000 net register tons							
Totals ...	... 1,288	1,003	1,192	3,483	4,338	5,568	
Steamers or Motor Vessels	1,182	908	1,076	3,166	3,990	5,081	
Loaded	... 1,027	820	947	2,794	3,365	4,335	
Coal	... 186	155	167	508	473	622	
Timber	... 93	35	43	171	353	860	
Grain	... 65	52	92	209	185	436	
General Cargo	... 439	393	423	1,255	1,424	1,560	
Ore	... 27	30	28	85	258	215	
German Vessels	... 588	454	592	1,634	2,111	2,485	
Total Revenue							
Total in Rm. 1000	... 555	433	489	1,477	1,787	1,805	
Rmks. per net reg. ton	0.43	0.43	0.41	0.42	0.41	0.32	

## Nust.

We are informed that the s.s. "Wytheville," which is operated by the Black Diamond Line for the United States Shipping Board, has been coated with Nust at Southampton. This preparation is manufactured by the Nor-Rust Liquid Lead Co., Ltd., and prevents rust.

This boat is also carrying a special consignment of Nust to the United States, in order that other boats of this line may be treated with this preparation.

# The Port of New York

Latest Data issued by the Bureau of Commerce

## Freight-handling Equipment at the Port of New York.

THE May, 1931, issue of the "Dock and Harbour Authority" mentioned the result of a survey of freight handling machinery in the Port of New York, with particular reference to heavy cranes employed in the handling of freight from ship to shore. With 50 of the newer piers equipped with cargo masts, 50 electric gantry cranes in operation, and a fleet of more than 200 floating hoists, including derricks capable of handling 300 tons, the Port of New York leads all other ports in the number and capacity of this type of equipment.

The survey of small freight handling equipment used on piers to speed up movement of goods to and from ships, and to and from warehouses and storage yards, shows the port to be well equipped in this respect also.

Small mobile mechanical equipment embraces storage battery tractors, manually loaded trucks and self-loading trucks. All three of these can and are used for hauling trailers loaded with freight. The manually loaded trucks carry their own freight, operating under storage battery power hither and thither on piers. The self-loading trucks operate by picking up and depositing loads of freight carried on skids, i.e., wooden or metal frames on legs.

Because of the large number of companies operating pier equipment, a complete census is difficult, but a partial survey shows that there are in the Port of New York to-day 1,129 electric battery units handling 30,000 trailers and 120,000 skids. The self-loading or lift trucks, in addition to handling skids, can be equipped with special devices such as chisel prongs, cradles, tiering apparatus, newsprint scoops and small crane hoists.

The use of this mechanical equipment is primarily designed to speed up the handling, decreasing the number of days required to load and unload a ship and thereby increasing the number of trips which can be made in a year. Some remarkable performance records are being made by this equipment at the Port of New York. Newsprint, which is imported in rolls weighing approximately 1,700 pounds, is ordinarily a difficult commodity to handle. Cargoes of 3,000 rolls are regularly unloaded in the Port of New York in 21 hours by storage battery trucks, a saving of two-thirds of the usual time. The rolls are automatically tiered three high, saving two-thirds of the storage space.

Another example of quick handling is found in the cargoes of sugar discharged at the Port of New York. Eight million pounds of sugar have been discharged in 69 working hours by lift trucks and platform skids, a saving of one-half the usual time. This sugar was transferred from shipside to warehouse and stacked ten bags high.

Some steamship companies are able to handle practically all their freight with modern equipment. The American South African Line, for example, states that during the last three years all freight has been loaded and discharged without the use of a single old type hand truck. This is a far cry from 1920, when the New York-New Jersey Port and Harbour Development Commission reported "Hand trucks are at present almost the sole reliance for this work (moving goods to and from shipside) on transoceanic piers at the Port of New York." The Port of New York is abreast of the times in the matter of mechanical freight handling equipment.

## Vessel Movements in Foreign Trade.

The number and tonnage of vessels entered and cleared in foreign trade at the Port of New York during the month of April, 1931, were lower than during the same period last year. Tonnage of vessels clearing showed a slight increase.

	April, 1931		April, 1930	
	No. of Vessels	Tonnage	No. of Vessels	Tonnage
Entrances	496	2,538,201	570	2,707,330
Clearances	521	2,656,992	585	2,640,380

## New York an "Ocean" Port.

One of the principal factors contributing to the remarkable development of New York as the world's leading port is the close proximity of its sheltered harbour to the open sea. This is thoroughly appreciated by navigators and shipping men, who dread taking their vessels up many miles of narrow riverway and tortuous channel of limited depth before reaching their docks. Pilotage costs are low at the Port of New York compared to the ports which lie from 50 to 100 miles up a river or estuary.

Arriving off Ambrose Lightship, a vessel coming into the Port of New York is only 12 miles from quarantine and another 7 miles from the Battery, with ample room to navigate in a channel 2,000-2,500-ft. wide, having a minimum depth of 40-ft. New York is one of the two 40-ft. harbours on the Atlantic Coast.

On outbound voyages, the largest vessels regularly make the run from pier to the open sea in two hours and less. The "Leviathan," sailing from Pier 86, N.R., at foot of West 46th Street, Manhattan, quickly slips down the Hudson through the harbour traffic and is past Ambrose Lightship in two hours, at a time when traffic in the harbour is at its peak of activity. The "Mauretania" makes the run from Pier 54, N.R., in 1 hour and 55 minutes, and the "Europa" from Pier 4, Army Base, Brooklyn, does it in 1 hour and 45 minutes.

Relatively few harbours in the world, berthing vessels of this type, are situated as close to the open ocean.

## Value of Foreign Trade at the Port of New York.

During the month of March, 1931, the value of exports and imports at the Port of New York amounted to \$187,747,000, representing 42 per cent. of the foreign trade of the whole United States. Foreign trade shows some improvement over the period from December to February, not only in actual dollar value but in relationship to last year. March figures still show trade to be 33 per cent. less than in a similar period last year, but this is a lesser decline than occurred in the previous quarter.

Exports to New York during March were \$86,028,000, or 40 per cent. lower than last year, while imports were \$101,719,000, or 27 per cent. less than last year. Imports have been better maintained than exports, showing not only a greater tonnage and value but also less decline from last year's figures than in the case of exports. Some of the larger items on the import list are textiles; vegetable food products and beverages; vegetable products, inedible; metals and manufactures; animals and animal products, inedible; and non-metallic minerals.

An analysis of the export trade at the Port of New York for the year 1930 shows that the Port handled 36 per cent. of the total exports of merchandise produced in this country. The eleven commodity groups are shown below:

Exports, by Commodity Groups, through the Port of New York in relation to total United States Exports.

Commodity Group	Exported Through New York	Total U.S. Exports	New York Per Cent. of U.S.
Machinery and Vehicles ...	545,707,000	832,862,000	65.5
Metals and Manufactures ...	175,697,000	354,402,000	49.6
Edible Animal Products (meats, lard, eggs, etc.) ...	92,321,000	186,896,000	49.4
Non-metallic Minerals (petroleum products, coal, etc.) ...	92,287,000	642,515,000	14.4
Vegetable Food Products (grains, flour, sugar, apples, etc.) ...	86,554,000	354,415,000	24.4
Textiles (including cotton) ...	88,592,000	639,941,000	13.1
Miscellaneous Merchandise ...	74,833,000	135,430,000	55.3
Chemicals (including soap, medicines and paints) ...	65,693,000	127,697,000	51.4
Inedible Vegetable Products (rubber and tobacco products, etc.)	65,404,000	262,275,000	25.0
Inedible Animal Products (leather and fur products) ...	57,845,000	91,515,000	63.2
Wood and Paper Manufactures ...	18,650,000	154,593,000	12.1
Total ...	1,358,583,000	3,782,571,000	36.0

It will be noted that the exports through the Port of New York consist mainly of manufactured products which are drawn both from the important Eastern industrial district, including thousands of plants in the Metropolitan area, and from the interior. New England alone ships 65 per cent. of its manufactures through the Port of New York.

Exports of industrial machinery in the United States during the year 1930 reached a total of \$220,913,000, of which 68 per cent. moved through the Port of New York. Machinery movements to European countries were higher in 1930 than at any time in the past decade, with Soviet Russia as the principal market.

Where an exporter has a commodity of high value or great perishability which requires prompt handling and special care he chooses the Port of New York. Fifty per cent. or more of the automobiles, airplanes, electrical machinery, pharmaceutical products, toilet preparations, meats, leather and fur products,

## The Port of New York—continued

typewriters, cameras, motion picture machines, and scientific instruments exported from the United States move through the Port of New York.

An excellent illustration of how shipment through the Port of New York ensures delivery of goods on time, satisfaction of foreign buyers, repeat orders, and savings in interest charges, is found in a recent incident. A Detroit manufacturer sold \$50,000 worth of automobiles for London delivery. When the shipment was unpacked in London the panel boards for the automobiles were found to be missing. The Detroit factory received an urgent cable on the morning on November 25th, 1930, requesting immediate shipment of the missing panels so that delivery of the cars could be completed. The shipping department in Detroit packed the forty-eight panels in one case, weighing 500 pounds, and shipped it by express to New York. Arriving the next morning, the case was delivered to the "Mauretania," sailing in the afternoon. The missing panel boards were delivered in London via Southampton exactly eight days after the cable was received in Detroit.

In contrast to the total time of eight days to London by the Port of New York, the same shipment, routed via Boston, would have taken 18 days; routed via Philadelphia, 28 days; routed via Baltimore, 27 days. The economy of shipment through a port which provides prompt handling and has fast and frequent direct steamship service to all parts of the world is evident. The interest charges alone on the automobiles amounted to approximately \$8.00 per day.

While the Port of New York enjoys a major part of the business in the export of high grade manufactured commodities, for some of the reasons outlined above, it by no means has a monopoly of the export trade of the United States. The above table shows that it is handling only a small portion of the textile group which includes raw cotton; the non-metallic group, which includes petroleum and coal; the wood and paper group, mostly lumber; and the vegetable products, both edible and inedible, which includes grain, fruits, and tobacco. The heavy tonnage commodities do not move largely through New York, as shown by the fact that although the Port handles 36 per cent. of the export, measured in terms of value, it handles only 16 per cent. measured in the terms of tonnage.

## Grain Exports.

Domestic grain exported during the month of March, 1931, increased over last year, but a decline in Canadian grain in transit brought down the total exports to approximately 25 per cent. less than March, 1930.

	March		Net Change Amount	Per cent.
	1931 Bushels	1930 Bushels		
<b>Through the Port of New York—</b>				
Domestic and Canadian Grain	4,912,000	6,624,000	—1,712,000	—25.9
Domestic Grain	450,000	271,000	+ 179,000	+66.1
Canadian Grain	4,462,000	6,353,000	—1,891,000	—29.8

The April and May figures, however, are expected to show a decided improvement.

The New York State Barge Canal elevator at Gowanus Bay, Brooklyn, is handling a very substantial part of the grain exported through the Port. During the past season approximately 20,000,000 bushels were taken care of by this one elevator alone. Up to May 16th the Barge Canal Terminal reported the receipt of 4,000,000 bushels, 400,000 bushels more than was handled in the same period last year. Twenty-eight freight ships have loaded full or part cargoes of grain at the Barge Terminal this year, but the bulk of the exports are still being shipped in parcel lots on regular liners. The Barge Terminal expects to handle 30,000,000 bushels this year.

## Steamship Sailings.

Although ocean carriers, in common with many other lines of industry, have been severely hit by the general depression in business, sailings every week from the Port of New York to all parts of the world are well maintained. For instance, during the month of April, there were 39 weekly sailings to the United Kingdom and Continental European ports, 47 to Caribbean and South American ports, 6 to the Far East, 2 to Africa, and 1 each week to Australia. No other port in the world can offer such frequency and diversity of sailings.

## Steamship Passenger Traffic.

Although there was a gain of 16 per cent. in the number of passengers going abroad via the Port of New York in March over the same month last year, this was offset by a drop of 33 per cent. in the number of arrivals, making a net decrease of 10,451 passengers. Most of this decrease is directly due to the small number of alien immigrants admitted, only 2,439 arriving last month as against 13,842 in March, 1929.

		March 1931	March 1930
<b>INBOUND—</b>			
Aliens - Immigrant	...	2,439	13,842
Non-Immigrant	...	8,020	10,041
U.S. Citizens	...	18,124	19,237
Total	...	28,583	43,120
<b>OUTBOUND—</b>			
Aliens-Emigrant	...	2,276	1,606
Non-Emigrant	...	8,607	8,070
U.S. Citizens	...	18,495	15,616
Tot. 1	...	29,378	25,292
Total—Inbound and Outbound	...	57,961	68,412
Total—First Quarter	...	155,990	189,620

Passenger travel via the domestic steamship lines serving the Port also fell off about 20 per cent. during the first quarter of this year from the same period in 1929. These services which operate between the Port of New York and the Pacific, Gulf, South Atlantic ports, and New England ports via Long Island Sound, carried a total of 100,149 passengers up to the end of March. This compares with 125,787 carried during the first quarter of 1930.

The combined movement of steamship passengers via foreign and domestic routes totals 256,139 for the first three months of the year.

## Commerce at Port Newark.

The volume of lumber received at Port Newark during the month of April, 1931, was 16,346,000 board feet, 52 per cent. less than during the same month last year.

Receipts of cargo other than lumber amounted to 22,097 tons, as compared with 10,015 tons in April 1930. This is an increase of 120 per cent., due partly to heavy receipts of potatoes from Canada. During the month of April, 1931, receipts of potatoes amounted to 9,675 tons, as against 1,198 tons in April of last year, an increase of 711 per cent. Canadian potatoes have been received at United States ports in relatively large quantities, despite the heavy duty of \$0.75 per 100 pounds.

All of the above cargo was delivered in 29 steamers, lighters, and barges.

## New York State Barge Canal.

Since the opening of the State Barge Canal System on Monday, April 6th, the following commodities have moved via this route up to May 9th: 6,105 tons of pig iron, 15,996 tons of iron and steel, 4,832 tons of copper and other metals, 3,378 tons of salt, 21,654 tons of sugar, 10,891 tons of fertilizer, 8,715 tons of chemicals, 211,367 tons of wheat, 3,130 tons of flaxseed, 16,649 tons of sulphur, 8,089 tons of anthracite coal.

All indications point to a record movement of tonnage through the canal this season.

The two 300-ft. cargo ships being built for the Ford Motor Company were recently launched. These vessels are to be named "Edgewater" and "Chester" and will have a beam of 43-ft., a moulded depth of 20-ft. and a draft of 10-ft., and are designed to carry 2,000 tons of boxed cargo. They will be propelled by two 800 h.p. geared turbine engines, driven by steam from oil-burning boilers operating at heavy working pressure. These cargo carriers will have a speed of fourteen miles an hour and will be used in service between the Ford plants at River Rouge, Michigan, and Edgewater, New Jersey. So that the vessel may clear all bridges in the Barge Canal the pilot's house is built over a sunken well, into which it may be lowered when necessary.

The 29 barges and 3 tugs of the Transmarine Line are being operated this year by the O'Donnell Transportation Company, together with its own fleet. This gives the O'Donnell Line one of the largest fleets on the canal, totalling almost 100 vessels.

The Seaboard-Great Lakes Corporation have taken over the operation of the fleet of five motor ships of the Erie and St. Lawrence Corporation, formerly the L.L.I. Line. It is expected that these motor ships will carry package and other freight between New York, Philadelphia, Boston and other seaboard ports, and Great Lakes points.

## Port of London Authority

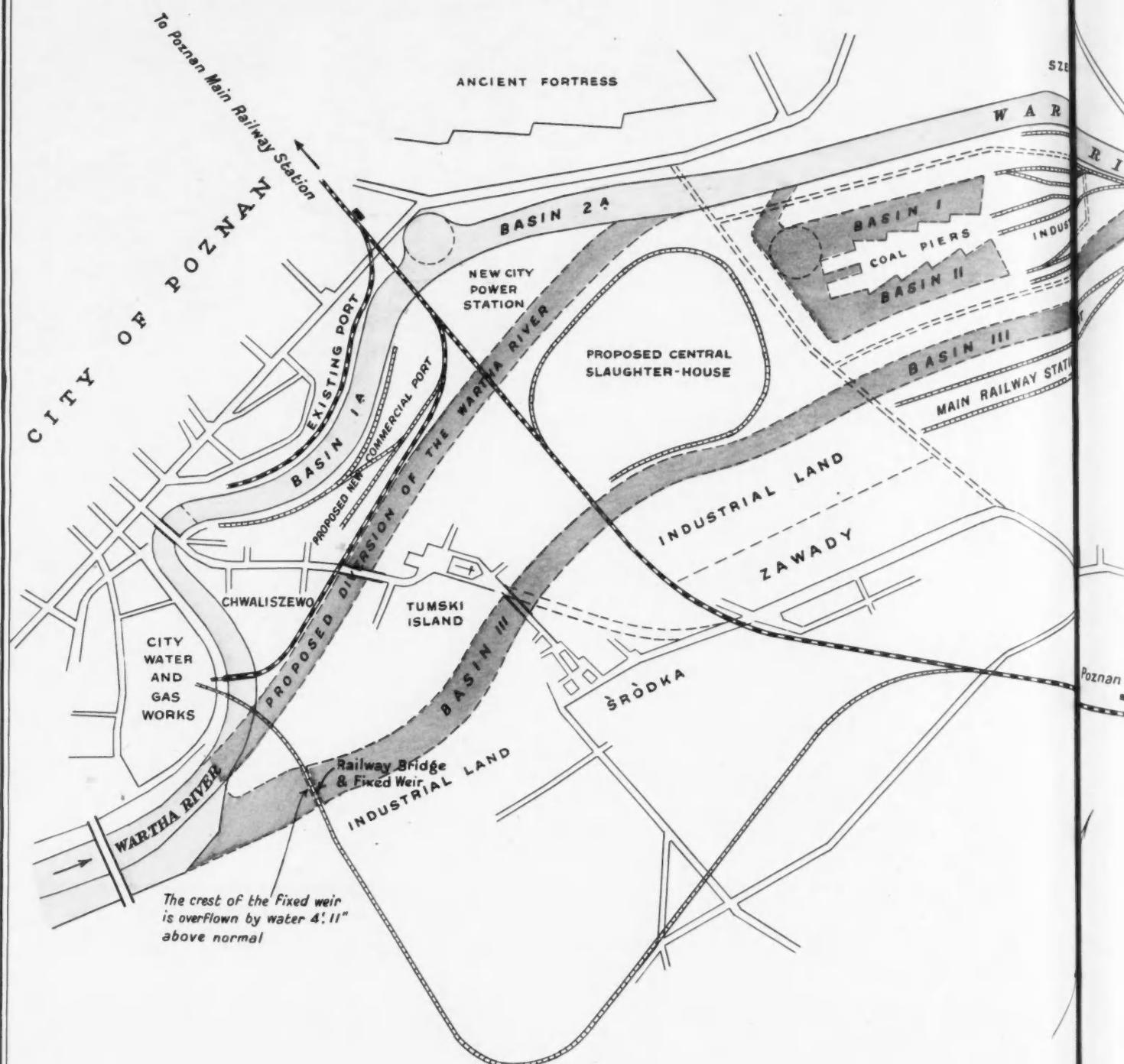
## Tilbury Passenger Landing Stage

Twenty-six vessels, representing 258,620 gross register tons, used the Tilbury passenger landing stage during the month of May. Altogether over 3,250 overseas passengers were embarked or disembarked at the stage, and considerable quantities of baggage and mails were dealt with in the average time of 2 hours 40 minutes per ship.



# PORT OF POZNAN.

UNDER THE JURISDICTION OF THE CITY COUNCIL OF POZNAN (POSEN), POLAND.

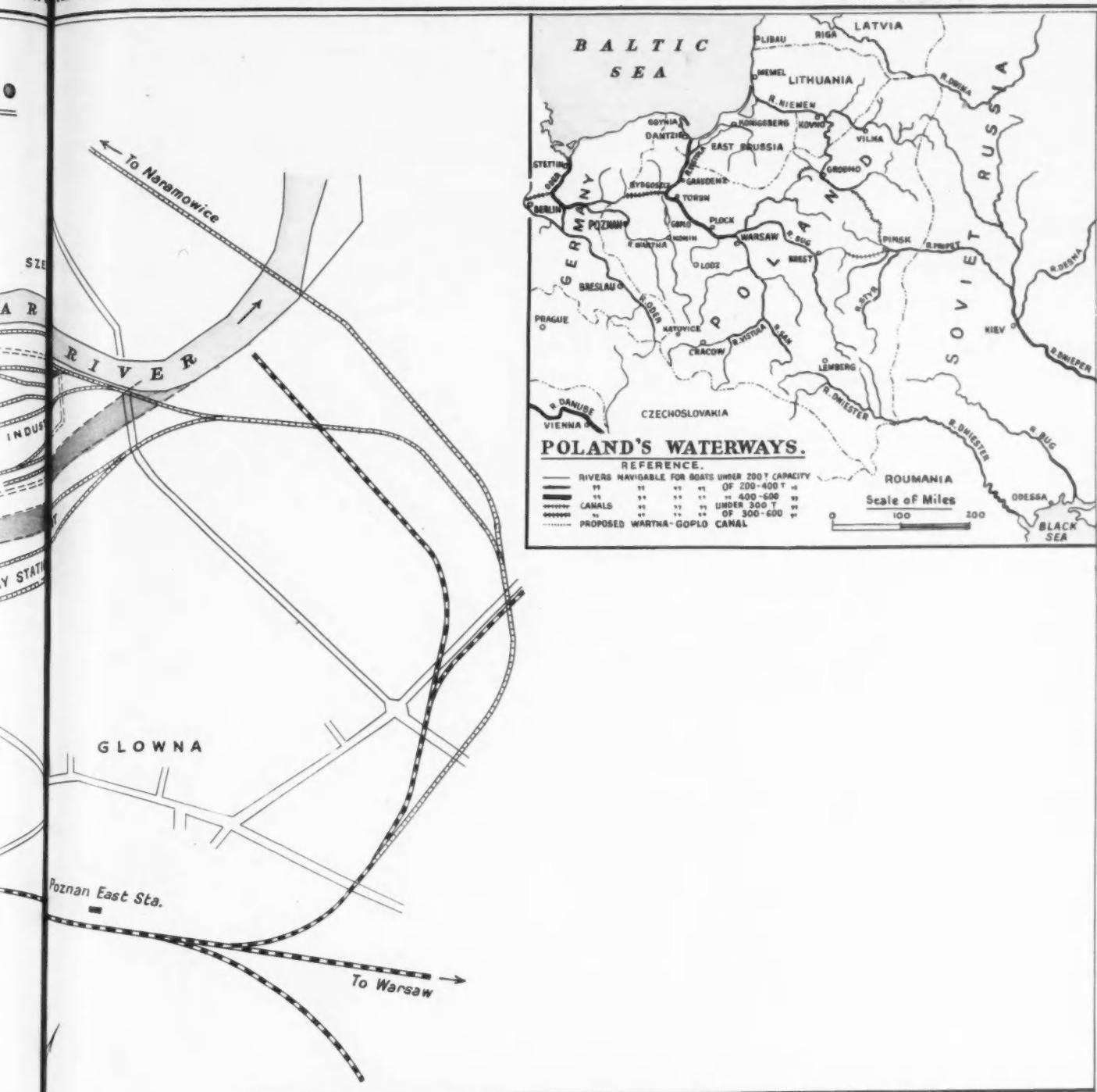


Note:- New Water Areas are coloured Dark Blue.

Scale of Feet.



ANBOUR AUTHORITY, JULY, 1931.





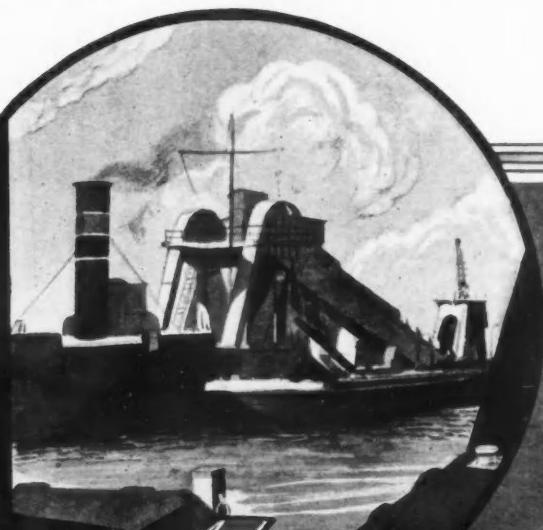


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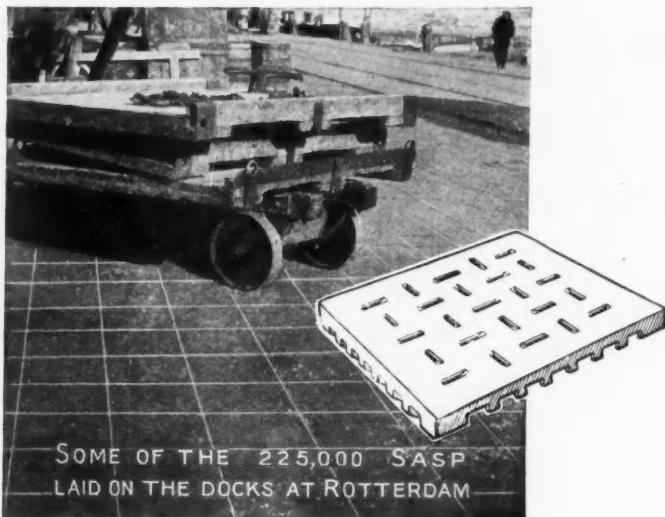


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## Notes from the North

### Runcorn Transporter Bridge.

**T**HE Runcorn Transporter Bridge, which was built on money borrowed over thirty years ago is on the eve of becoming debt-free. Although the bridge belongs to the Widnes Corporation an annual payment of £572 has been made out of the Runcorn Urban rate to wipe out the £10,000 which Runcorn invested when the Bridge Co. was formed.

One of the two bridges which cross the river Mersey at Runcorn, that which carries the railway traffic, was the scene of an accident which might have had disastrous consequences recently. A driving wheel of the leading engine hauling an express train left the metals as the train was crossing the bridge, at a spot where there is a sheer drop of 70-ft. The angle irons which guard the rails running over the bridge played the main part in preventing a disaster. If these had given way, the train would have fallen upon the iron plates on the bridge structure and nothing could have prevented the train from crumpling up. From the smashing of the timbers and the damage to guard rails, it is gathered that the engine left the metals as it crossed the first span of the bridge on the Cheshire side, but apparently travelled the remaining portion of the bridge and about 150 yards on the Lancashire side before coming to a standstill. The consequences would have been much more serious had the engine left the rails on the side of the bridge iron work. After a few hours the damage was repaired and a normal service restored.

### Morecambe Old Harbour.

Provided the Morecambe Corporation complete forthwith the purchase of the old harbour, now used as a ship-breaking depot, and land adjoining for £57,000, and undertake promenade improvements in front of the site of the new hotel, the L.M.S. Railway Company intend to build a new hotel on the site.

### Ribble Navigation.

The officials of the Ribble Navigation recently acquitted themselves with distinction by their skilful handling of the "Moordrecht," the biggest boat that has so far entered Preston Dock. This oil tanker carried a cargo of 3,600 tons of petrol. She negotiated the river on a 24-ft. tide without a hitch, and though the task of getting her into dock was necessarily slow, seeing that the beam of the boat is 58½-ft. and the width of the lock 66-ft., there was never any difficulty in getting her through. Preston Dock is one of the most spacious in the country, and the original projectors of the undertaking, though they probably hardly anticipated the berthing of such huge ocean-going craft, did well in allowing for plenty of width as well as length in the dock basin. One of the technical problems in handling big boats is the swinging for the return, and it was possible to do this at Preston Dock even with a vessel of 455-ft. overall, because the dock is 600-ft. wide and there was ample room to get her round. The "Moordrecht" is the biggest boat that has so far entered Preston Dock.

### Dock Director's Retirement.

Mr. J. H. Sharrock, who is a director of the Ardrossan Dockyard Ltd., has resigned his position as chairman of the Liverpool Elder Dempster Line directorate. Mr. Sharrock is a Liverpool man, and he joined Elder Dempster as an apprentice. He went with Sir Alfred Jones to Jamaica in connection with the establishment of the Imperial Direct West India Mail Service. Of West African development, Mr. Sharrock has intimate knowledge, and not a little of his success has been due to the fact that he has always been sufficiently ahead of the day to anticipate the developments of to-morrow. Mr. Sharrock is also a director of the African Steamship Co.; Elder Dempster (Grand Canary) Ltd.; Elder Dempster (Teneriffe), Ltd.; Elders Insurance Co., Ltd.; Liverpool Cartage Co., Ltd.; Nigerian Transport Co., Ltd.; and the West African Lighterage and Transport Co., Ltd.

### Use of Rat Guards in Mersey Docks.

All dock and harbour authorities are obliged to give attention from time to time to the trouble caused by rats, some of which affected by plague may escape from vessels which have visited foreign ports and do untold damage to goods lying on the quays. Special precautions are taken on the Liverpool Dock Estate and samples of the rat population from the dock quays, sheds and warehouses are obtained daily. All rats so caught are submitted to the city bacteriologist for examination. In order that this work may be carried out efficiently the Port Sanitary Authority employs a staff of eleven full-time rat-catchers and rat-searchers, and one part-time rat-catcher, states the annual report of the Medical Officer. All vessels

with the exception of coastwise vessels must have rat-guards affixed to their moorings during their stay in the port. The rat-guard used and approved of by the Port Sanitary Authority consists of a disc of galvanised sheet iron, 1/16-in. thick and 3-ft. in diameter. The edge is left raw, i.e., not wired or turned over. In the lower half is cut a door, hinged and so fastened when shut that no foothold is afforded to rats. The door slit leads to the central hole through which the rope passes. Round the central hole is placed a strong collar projecting about 4-in. on each side and riveted to the disc. In the collar is a strong steel spring clip, which can be adjusted by means of a winged nut and bolt. To apply the guard, the door is opened and the guard put over the rope, so that the latter passes up into the central hole, where a little force is necessary to overcome the spring of the clip. The guard will now hold quite firmly and the bolt and screw closing the opening of the clip gives additional security. The door is then closed and fastened, the upper edge being fitted with a piece of thick sheet rubber attached so as to close completely the central hole whatever the size of rope in use. A rat-guard to be effective should be placed at the ship end of the mooring and as far as possible away from the ship's side. When vessels loaded with cargo are infected with either human or rodent plague the following procedure is adopted in order to prevent the passage of rats from the ship to the shore:—If the vessel is loaded a preliminary fumigation may be undertaken to destroy the rats, the nature of the cargo would, however, determine this. The measures enumerated below are enforced pending discharge of cargo, when a complete and thorough deratification takes place.

- (a) The vessel is breasted off six feet from the quayside.
- (b) Rat-guards are adjusted on all moorings.
- (c) One gangway only is allowed, and a watchman is stationed on it day and night.
- (d) The gangway must be lifted at sunset and not lowered until sunrise.
- (e) The cargo may be discharged under supervision of the Port Sanitary staff.
- (f) Trapping and examination of rats caught in the neighbouring sheds.

### Attracting New Industries.

For the purpose of encouraging new industries in Lancashire, the Mersey Docks and Harbour Board has contributed £200, the Liverpool Organisation £100, and the Manchester Ship Canal Co. £50 to the funds of the Lancashire Industrial Development Committee.

### Ship Canal Directorate.

Sir Harry Gloster Armstrong, until recently Consul-General at New York, has been appointed by the directors of the Manchester Ship Canal Company to act in a commercial advisory capacity, with headquarters at the company's London office. Sir Harry from 1902 to 1919—when he was appointed Consul-General in America—was the representative to the Manchester Ship Canal Company in the United States, opening and organising the company's first office abroad.

### Over 100 Vessels in Port.

Recently there was harboured at Wyre Docks, Fleetwood, a fleet of over 100 fishing vessels. This was in consequence of the poor market for fish. The number of ships fishing out of the port has increased considerably since the middle of May and stands at about 250. Of these 102 were in the dock, including 55 of Fleetwood owned ships and 47 seasonal visitors. The outer dock, where many trawlers are undergoing extensive overhauls in anticipation of improved markets, was literally a mass of shipping with only a lane of water down the middle. In places the ships were moored six abreast.

### Proposal To Bridge Dee Estuary.

The idea of spanning the Dee estuary by means of embankments and a central bridge, so as to give direct communication between Wirral and North Wales, has been brought before the Ministry of Transport by Councillor H. H. Nuttall, of Liverpool. Mr. Nuttall is advocating the construction across the estuary of a double track of railway, a road, and a promenade and in laying before the Permanent Secretary details of the scheme from the points of view of practicability and utility, he said Rhyl would be brought as near to Liverpool as Southport, and a great saving in distances would be effected in reaching North Wales places or coming from them, when compared with present rail services through Chester, and road transport via Queen's Ferry. The estimated cost of the scheme is £6,000,000. Liverpool Industrial Traffic Association invited representatives of the railway companies and of all the transport associations of the port to a meeting, which was held in Liverpool on June 18th, to discuss the matter. Members of the Merseyside and Deeside local public bodies also attended in a private capacity to examine details of the scheme.

## Notes from the North—continued

**A Royal Visitor to Clarence Dock.**

When Prince George visited Liverpool and Manchester last month (June) he literally hustled his guides. He entered the estate of the Mersey Docks and Harbour Board and made a tour of inspection of the Clarence Dock Power Station which is under construction for the Liverpool Corporation, and which will shortly take the place of the Lister Drive Power Station. He also enjoyed the experience of being the first Royal visitor ever to travel from one end to the other of the new Mersey Tunnel. Last year the Duke of York visited it, but on that occasion the party travelled only half way through the tunnel and then returned to the Liverpool side again. Prince George visited the shipbuilding works of Messrs. Cammell Laird and Co. and also the factory of Messrs. Lever Bros. at Port Sunlight, and then he returned to Birkenhead on board the Mersey Docks and Harbour Board's steam yacht, the "Galatea." Here he was met by officials of the Dock Board and sailed to Gladstone Dock to make an inspection of the wonderful facilities there.

The Prince entered the Mersey Tunnel from the Liverpool side and having donned overalls in one of the tunnel sheds, travelled on a train of five little open toast-rack cars, each with its own separate electric motor box and led by an even smaller truck as the pilot engine. At one stage of the journey as the train proceeded along the overhead section, the coach jumped the points and the party received an unexpected jolt. The mishap caused some amusement, although only a wooden barrier at the side of the lines separated the trolleys from a 30-ft. drop to the iron roadway below, where a number of workmen gazed up at the commotion. After just under half an hour the party arrived at the Birkenhead entrance. After examining the graving docks at the Cammell Laird establishment, the party crossed the bridge connecting the huge wet basin with the inner basin and entered the newer part of the yard. In the boiler shop of the works Prince George was an interested spectator of the manufacture of the steam drum-heads for the boilers of H.M.S. Achilles, whose construction he inaugurated. By pressing a button, two specially prepared plates forming the keel plate of the cruiser were lowered on to the blocks and he then operated a machine which combined the two plates. At Manchester, the Prince visited the Trafford Park works of the Metropolitan Vickers Electrical Co., Ltd., and saw large electrical and steam plants being made for various British and Continental ports. What particularly attracted him was a number of electric motor frames which will be sent to the Nile Delta. At present a great work is in hand there. An area of the Delta one hundred miles long and about ten miles broad is sunk under salt. The land will be drained, ditched and then flooded with fresh water. This fresh water will wash the salt from the land and gather in the ditches from which it will be pumped again. By these means, repeated many times, it is hoped to cleanse the land of salt and so create new arable fields and pasturage.

**Restricted Axle Weights.**

Liverpool motor haulage contractors, especially those who are engaged on dock transport, have been very much perturbed by the action of the police, both in Liverpool and Bootle, in regard to the laden weight of steam wagons and heavy petrol machines. A deputation, therefore, has waited on the Town Clerk and on the Chief Constable to present the views of the owners and users of such vehicles. The deputation was given a sympathetic hearing. They pointed out the heavy weights that could be carried on horse-drawn vehicles and made a point of the fact that if the restrictions in the Road Traffic Act were imposed, it would be a serious thing for many vehicle owners, some of whose vehicles will be rendered practically useless, quite apart from the burden of heavy transport charges thrust on traders. In the interests of the port, the authorities were urged not to take action against owners of heavy vehicles until a satisfactory solution is found of the difficulty.

**Useful Dock Haulage Unit.**

Demonstrations of the Karrier "mechanical horse" with hydraulic harness have been given at the L.M.S. Park Lane goods station, Liverpool, by Mr. J. V. Wilson, of Karriers Motors, Ltd., Huddersfield, and Mr. H. A. Edwards, of the Liscard Motor Co., Ltd., the local agents. Although excessive speeds are not required on work such as quay work, for which the mechanical horse is most eminently suitable, it is essential that it should have absolute "manoeuvrability"; that this has been achieved is obvious from the fact that the vehicle can be turned in its own length while the driver has complete control when walking alongside the vehicle and directing the steering wheel. The tractor has three wheels and is driven off the rear wheels, the single front wheel being used for steering the vehicle. The tractor can be coupled to existing horse-drawn vehicles by means of a simple coupling device.

**Dock Quays not for Storage Purposes.**

Dock quays should not be like a shop counter where goods can lie indefinitely, said Mr. J. B. Glyn, a Liverpool ship-owner, in a Chamber of Commerce discussion on watching charges at the Liverpool docks. Certain sections of importers are pressing for the abolition of watching charges, but the Mersey Docks and Harbour Board finds it impracticable to extend the free period beyond 72 hours. Colonel Hawkins (assistant general manager of the Dock Board) states that the question has been before the Dock Board many times. The master porters' rates, he said, include "watching" for seventy-two hours; anything over that would have to be paid for. The matter, however, is being considered.

**Isle of Man Lighthouses.**

A question has been asked in the Isle of Man Tynwald concerning shipwrecks that have occurred off the West Coast of the Island in recent years. It is suggested that probably these shipwrecks would not have taken place if there had been a lighthouse and fog signalling station situated at Contrary Head.

**Fleetwood Dock Works.**

Sir Josiah Stamp, president of the London, Midland and Scottish Railway Company, visited Fleetwood recently in connection with the new dock works which his company intends to undertake. Armed with plans of the Wyre Docks and also of the proposed £750,000 dock scheme, Sir Josiah walked round the fish dock and was later met by Mr. W. Carson, the assistant dock superintendent, who also escorted Sir Josiah round the Wyre Dock. Together with Mr. W. Gerrard, the deputy Dock Master, the officials discussed the plans.

**Mersey Tunnel Progress.**

The work of constructing connections for ventilating purposes between the shafts and the main boring of the new Mersey Tunnel is proceeding rapidly and the engineers have reported to the Tunnel Joint Committee that £73,000 has been spent up to date on this contract. Altogether 810 men are working on the tunnel, 150 being on the Birkenhead side, where only five per cent. of the constructional work on the tunnel and concrete roadway remains to be completed. Nearly 500 men are still at work under the river on the iron lining, concreting and road-making operations. Ninety-nine per cent. of the work on the four contracts has now been completed. The contract totals were £3,217,951 and the value of the work done is £2,900,000. It is understood that no definite date has been fixed for the opening of the tunnel, but the probability is that it will not take place until the beginning of next year. The ventilation problem is believed to have been solved satisfactorily, but considerable time will be required in connection with the building and plant.

**Dock Board's Warning.**

Evidence on behalf of the Mersey Docks and Harbour Board, as conservancy authority for the River Mersey, was given at a Government inquiry at Formby concerning a new sewage scheme. Mr. A. E. Moorhouse, for the Dock Board, said that while they did not oppose the scheme and were satisfied with Formby's assurance to continue to deal with the sewage by settling tanks, they felt it was desirable, as the result of a report by a scientific committee of chemists, bacteriologists, geologists and engineers, after three years of exhaustive study, to warn Formby Council and other authorities that a time might come when it would be necessary to provide by filtration, for further purification to render sewage effluents discharged into the Mersey and Liverpool Bay innocuous.

**New Ferry Boats for Wallasey.**

One of the best known Mersey ferry boats, the "Royal Iris," operated by the Wallasey Corporation, is to be pensioned off. Subject to a slight alteration in the specifications, the Ferries Committee recommends the Council to place an order with a firm whose tender is within a few hundred pounds of £43,000 for a new boat. Opinion is divided as to the wisdom of ordering two boats if the unemployment grant can be obtained, but it is believed to be probable that when the matter comes before the Council it will be decided to defer for a year the building of a second boat to take the place of the "Royal Daffodil." The "Royal Iris" and her sister ship, the "Royal Daffodil," are two vessels of Zeebrugge fame, which are to be superseded, are certified for 1,735 passengers. A novel feature to be introduced in the new boat, which is to be of approximately the same carrying capacity, will be the utilisation as a sunshine promenade for 400 passengers of the deck abaft the funnel, which in the existing steamers serves as a roof of the promenade deck.

## Notes from the North—continued

**Bidston Dock Excavations.**

Three men engaged in excavation work for the new dock at Bidston Moss, near the Penny Bridge, Poulton, recently had a narrow escape from being buried alive. They were working on the night shift when the side of the pit in which they were engaged, suddenly collapsed and they were covered with tons of debris. One of them was almost completely buried and when his two companions set to work to extricate him, a further fall occurred, burying them also. Their cries for help attracted the attention of other men, who frantically set to work to release them. They were eventually rescued and taken to hospital.

**Turned Down.**

Recently a report was furnished to the Ministry of Health concerning a scheme of the Preston Corporation for the protection and improvement of the north bank of the River Ribble. The Ministry intimates the view that the purpose to be served by the proposed work would not be more than the protection of a few small properties in times of very exceptional flood in the river, and that in the circumstances the department did not feel justified in sanctioning a loan for a large outlay. The Council has decided not to proceed with the scheme.

**Approval for Dee Estuary Scheme.**

Considerable interest has been aroused on Merseyside by the proposal to construct a six-mile embankment and bridge across the River Dee estuary. The matter was carried a stage further by the conference which was held in Liverpool on 18th June. Coun. H. H. Nuttall, who by profession is an engineer, is one of the prime movers in the scheme and he explained in detail the plan for building a combined road, railway track and promenade, 80-ft. wide, from Hilbre Point to Point of Ayre. The cost, he said, would be about £6,000,000. The Dee channel would be crossed by a bridge with twelve spans of 240-ft. and training walls would direct a way along the Flintshire coast navigable by steamers up to about 800 tons and linking up with the canalised portion of the River

Dee at Shotton. This would probably give rise to a great industrial development as well as provide immediate work for something like 3,000 men. The main channel of the Dee would be developed into the Mostyn Deep and thence along the Flintshire coast to Connah's Quay. Mr. J. A. Brodie, who is joint engineer to the Mersey Tunnel Joint Committee, while sympathetic to the idea, said it would be no light job to start interfering with the channel of the River Dee and it would require to be approached very carefully. The bridging of the River Dee, however, was no serious matter. There would not be a ghost of a chance that any scheme would be passed if it interfered with the navigation of the Dee. Mr. Caradoc Williams, engineer to the Dee Conservancy Board, said that the Board was now considering a similar scheme by Messrs. Wilton and Bell, of Westminster, and they had not yet dealt with Mr. Nuttall's proposals. A resolution was adopted calling for a Ministry of Transport inquiry into the proposals.

**A Ten Years' Job.**

Isle of Man Tynwald has voted £47,000 to the Harbour Commissioners to enable them to proceed with the extensions to the Red Pier. The work will take about ten years to complete and the annual cost will be about £20,000. The first part of the work has been more costly on account of the dredging that was required. A number of men have recently been taken off, because of the delay in dredging which prevented the foundations being put in. Furthermore, as many concrete blocks have been made as there is storage accommodation for.

**Presentations to Dock Officials.**

In the engineer's office of the Mersey Docks and Harbour Board, Mr. Henry Brooke and Mr. Harry Whittle, on their retirement from the general office, were presented respectively with a pair of binocular glasses and a clock. Mr. McFarlane and Mr. L. Leighton, the principal assistant engineer, made the presentation on behalf of the subscribers with well-chosen eulogium.

**Aden Port Trust.**

The returns for the month of March, 1931, of shipping using the port are as follows:—

	No.	Tonnage
Merchant Vessels over 200 tons	117	470,585
"    under 200 tons	4	672
Government Vessels	10	16,991
Dhows	95	2,553
PERIM.		
Merchant Vessels over 200 tons	19	67,674

## TRADE OF THE PORT.

Article.	Unit.	Imports.		Exports.	
		Quantity.	Value Rs.	Quantity.	Value Rs.
Coal	Tons	4,439	1,19,560	0	0
Coffee	Cwts.	6,074	2,06,606	6,765	3,07,958
Grain, Pulse and Flour	"	55,410	3,22,899	33,112	1,88,084
Gums and Resins	"	3,463	67,145	3,755	75,327
Hardware	"	0	22,530	0	9,890
Hides, raw	No.	1,267	2,410	12,297	17,979
Oil, Fuel	Tons	34,507	10,35,210	0	0
" Kerosene	Gls.	13,664	10,244	7,220	5,577
" Petrol	"	0	0	1,360	1,724
Salt	Tons	0	0	12,300	1,32,000
Seeds	Cwts.	1,316	15,869	1,126	14,048
Skins, raw	No.	270,100	2,16,854	432,463	3,75,815
Sugar	Cwts.	20,719	1,22,555	12,086	74,621
Textiles—					
Piece Goods, Grey	Yds.	4,566,212	7,22,880	4,170,225	6,89,247
" " White	"	592,130	1,33,875	243,584	59,015
" " Printed or Dyed	"	859,313	2,07,123	738,955	2,10,637
Twist and Yarn	Lbs.	247,600	1,65,443	229,214	1,67,297
Tobacco, Unmanufactured	"	135,996	42,562	404,180	76,260
" Manufactured	"	30,268	33,442	37,968	41,066
Other Articles	No. of Pkgs.	72,343	9,10,564	23,328	4,76,262
Treasure, Private	"	0	4,76,171	0	2,21,797
Total	—	—	48,33,942	—	31,47,604

The number of merchant vessels over 200 tons that used the port in March, 1931, was 117 as compared with 128 in the corresponding month last year and the total tonnage was 471,000 as compared with 541,000.

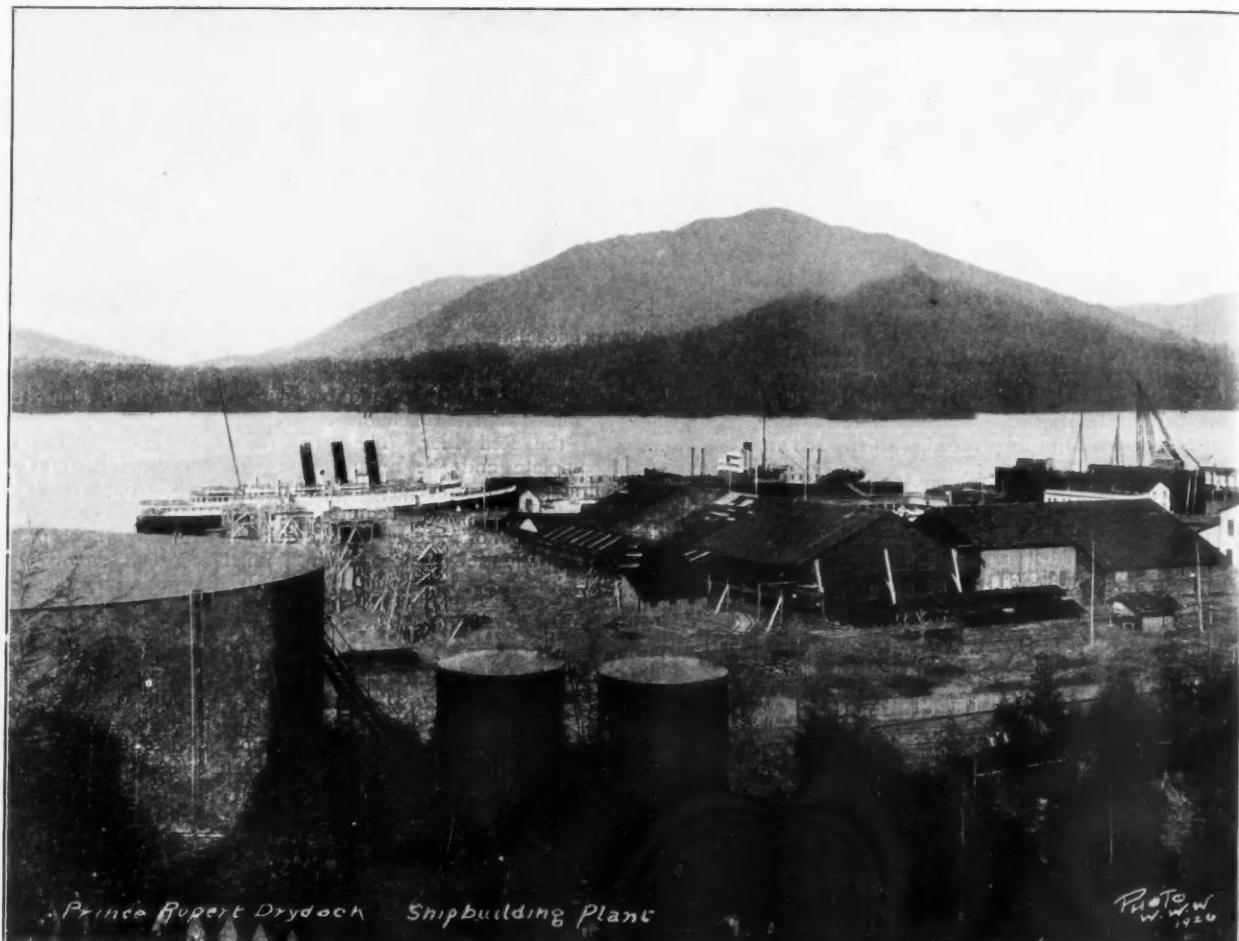
Excluding coal, salt, fuel oil and military and naval stores and transhipment cargo, the total tonnage of imports in the month was 8,600 and of exports 5,800 as compared with 8,300 and 5,100 respectively for the corresponding month last year.

The total value of imports, excluding Government stores,

piece goods (printed or dyed) and twist and yarn; and below in the case of coffee, seeds, skins (raw), sugar, tobacco (unmanufactured and manufactured) and treasure (private).

Exports were above those for March, 1930, in the case of coffee, grain, pulse and flour, gums and resins, hides (raw), seeds, piece goods (grey), piece goods (printed or dyed) and twist and yarn; and below in the case of hardware, skins (raw), sugar, piece goods (white), tobacco (unmanufactured and manufactured), and treasure (private).

## Prince Rupert Harbour, British Columbia.

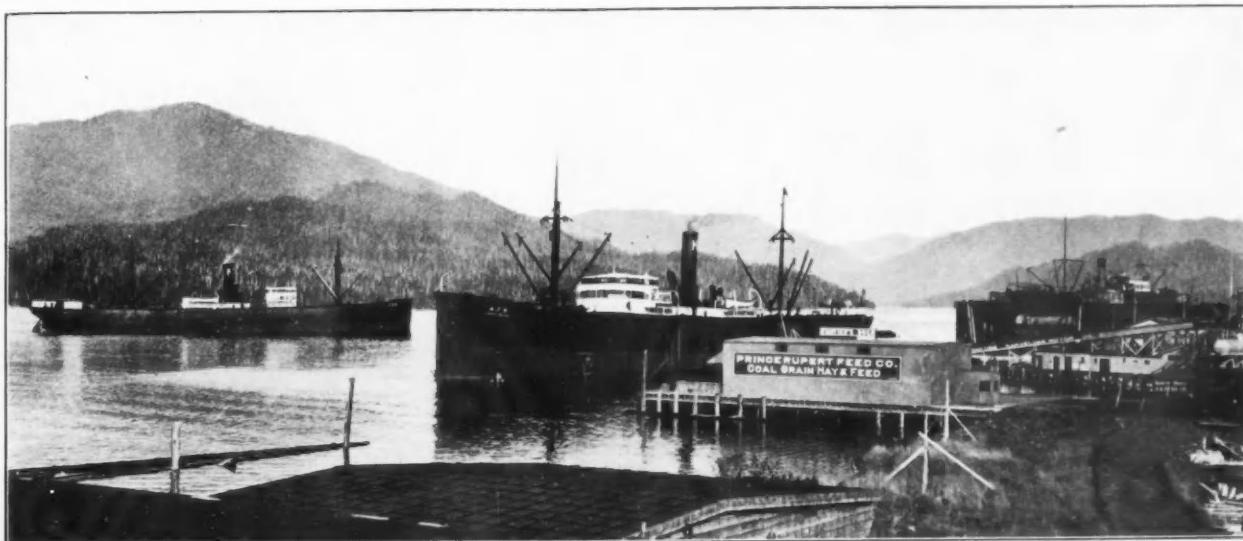


Prince Rupert Dry Dock and Shipbuilding Plant. The Harbour is one-and-a-half miles wide at this point.



Canadian Government Elevator at Prince Rupert. This has a storage capacity of 1,250,000 bushels.

## Port of Prince Rupert, British Columbia



*Japanese Freighters in Prince Rupert Harbour. These Boats loaded the First Cargo of Grain from this Port on October 22nd, 1926.*

PRINCE RUPERT has a natural harbour, completely landlocked and with good holding ground for anchorage. The maximum rise of tide is 24-ft., mean range 15-ft.; minimum depth of anchorage at low water 15 fathoms. Approach to harbour is easily accessible with lights and buoys provided. Pilots are available. After a navigator has once entered the harbour he can do so afterwards without the aid of a pilot. The distance from the docks to ocean is 30 miles. There is a wireless station at Digby Island, connected to Prince Rupert by telephone, capable of communicating with stations 500 miles distant, also a quarantine station and docks. There is no Harbour Board at Prince Rupert, consequently no tonnage taxation.

There are eight wharves, including the following: Canadian National, 1,300 and 860-ft. long respectively, with warehouses thereon 600-ft. and 800-ft. long respectively, equipped with Barlow elevators and conveyors. Provincial Government wharf 500-ft. long with two-storey warehouses and offices. Imperial Oil Company's wharf, Union Oil Company's wharf, Home Oil Company's wharf, lumber assembly wharf and others, making a total frontage of some 4,000-ft., in addition to the elevator wharf.

The Imperial Union Oil and Home Oil companies have large storage capacities for oil. The depth of water at all wharves is 35-ft. to 40-ft. at low tide.

The Canadian National Steamship Company operates one of the largest dry docks in America with a capacity of 20,000 tons and a length of 600-ft. with fully-equipped marine repair shops and foundry and a shipbuilding plant in connection. The dock is in three sections.

Stone or gravel ballast is available. In the matter of marine insurance Prince Rupert is on a parity with other large Pacific seaports, being excluded from the North American Warranty.

The Dominion Government operates a modern grain elevator of 1,250,000 bushels capacity. The elevator is of steel and reinforced concrete construction, and is now leased to the

Alberta Wheat Pool. The unit comprising the storage bins measures 277-ft. 6-in. in length and over 68-ft. in breadth; the workhouse is 62-ft. by 94-ft. and the car unloading shed is 101-ft. by 58-ft. 6-in. The storage capacity of 1,250,000 bushels is divided amongst 130 bins of varying sizes. The 36 largest of them can hold 25,000 bushels each; 24 can handle 6,000 bushels each; 22 are of 5,000 bushels capacity; 15 of 3,000 bushels capacity and remaining storage units are constructed to hold 1,200 bushels each.

The receiving capacity of the house is 18 car loads per hour, and the shipping capacity is 50,000 bushels per hour. There are 12 grain cleaners, which makes it possible to clean 15,000 bushels per hour. These are Monitor wheat cleaners. A drying of 1,000 bushels per hour is afforded by a Morris grain drier.

The regular grain equipment includes two 9a Monitor scales, two high Carter disc machines and one single Carter discs. Clarke automatic shovels are used for unloading. There are five 2,000 lbs. Gurney scales. Electricity is used for power and light. There are 45 electric motors with an aggregate 1,327½ h.p. A 4,000-ft. Morse silent chain drive is used in connection with the power installation. There are 26 belt conveyors in the house, representing a total length of 13,000-ft., ranging in width from 16 to 40-in.

The wharf in front of the elevator is 1,000-ft. long. There are 19 grain spouts on it. It is protected with a fire hose every 150-ft. and there is 35-ft. depth at low tide.

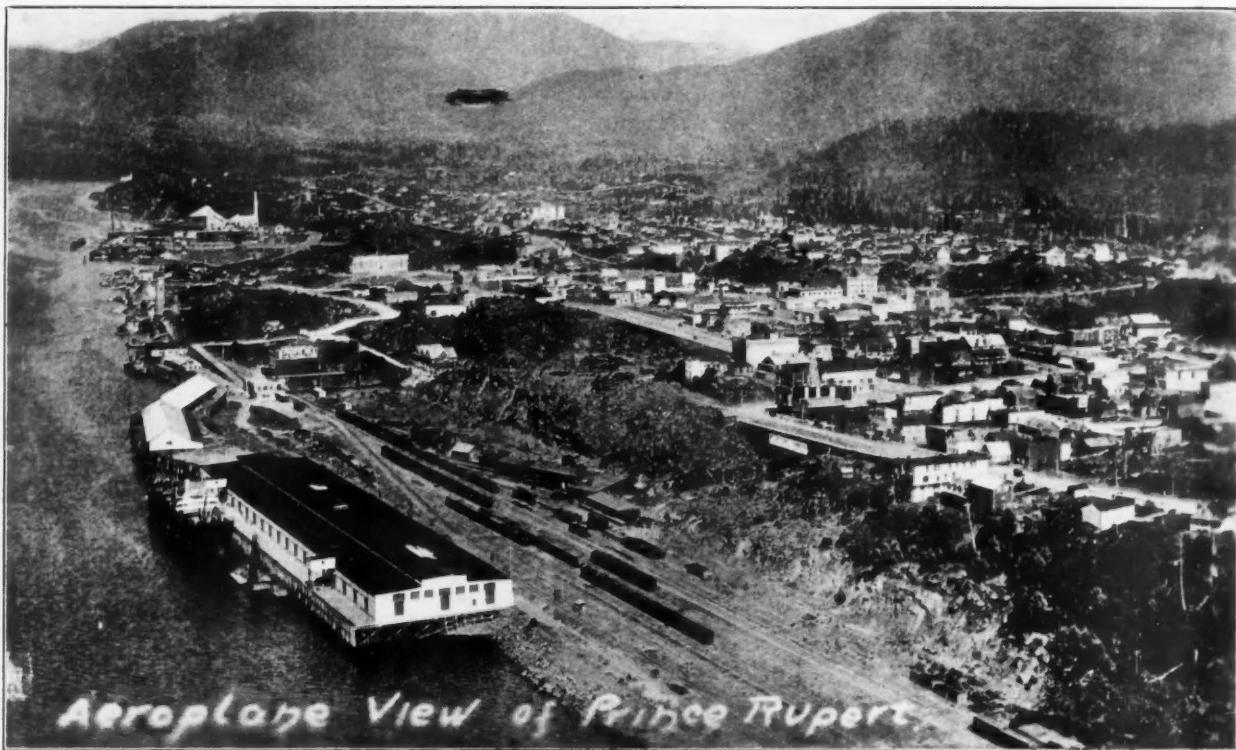
Prince Rupert has a large shipping tonnage, both foreign and coastwise, and there are three lines of steamships calling regularly both north and south-bound, and also a large fleet of fishing boats make their headquarters at this port. The figures for the year ending March, 31st, 1930, are as follows:

Foreign	...	Inwards, 2,386 vessels of 196,397 tons
		Outwards, 3,277 vessels of 191,583 tons
Coastwise	...	Inwards, 1,523 vessels of 693,951 tons
		Outwards, 1,580 vessels of 700,831 tons



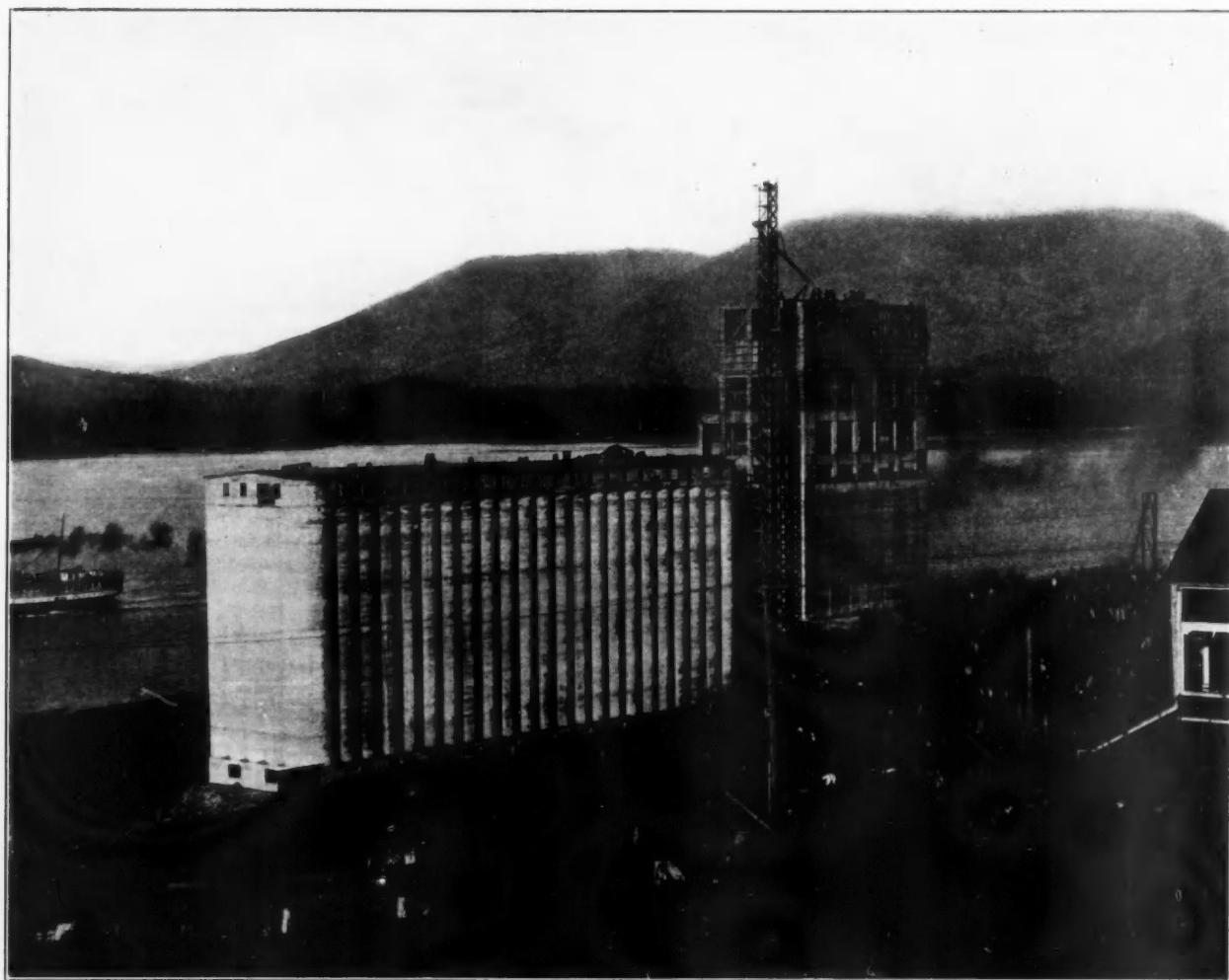
*Prince Rupert Cold Storage Plant, which is the Largest Fish Cold Storage in the World and handles about 20,000,000-lbs. of Fish yearly (principally Halibut and Salmon).*

## Prince Rupert Harbour, British Columbia



*Aeroplane View of Prince Rupert.*

*Aerial View of Prince Rupert.*



*Prince Rupert Grain Elevator, which has a storage capacity of 1,250,000 bushels.*

## Monolith Foundations\*

By H. CARTWRIGHT REID, C.B., J.P., M.Inst.C.E. (Hon. Member)

Lecture delivered in London, 13th Feb., 1931, at a Meeting of the Junior Institution of Engineers

**M**ORE than thirty years have elapsed since I read a paper to this Institution, and great advances in civil engineering practices have taken place in the interval.

In my paper, entitled "Piles and Pile Driving," read at the meeting held on 14th April, 1899,† I thought I was giving you the last word on foundations for wharf walls carried on piles 14-in. square and 50-ft. deep. Since that date progress in foundation work has made enormous advancement, with which I have been closely associated, and I propose now to describe some of the features attendant on putting down foundations 40-ft. square and over 100-ft. deep.

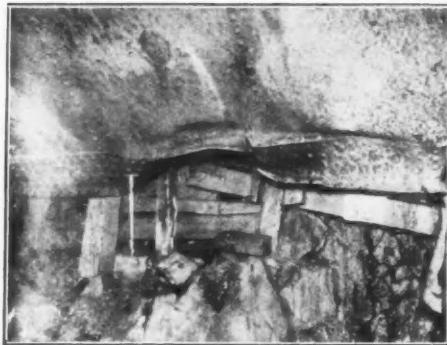


Fig. 1. Shoe of monolith damaged by contact with boulder.

Though piles are still used for the lighter structures, such as piers and jetties, reinforced concrete has displaced timber; but for heavy walls, monolith foundations are now almost universal, and practically every problem on great marine engineering works has, in recent years, been solved by the use of this type of foundation.

Notwithstanding this development in this century, the principles on which these monolith foundations are based were known and practised for more than 100 years in India, where foundations for bridge piers were constructed by sinking what were described as "wells," i.e., circular brick rings sunk in the soft alluvial plains of India by taking out the sand from the inside. A description of such an operation was given in a paper published in the "Royal Engineer Journal," in 1863, but these tiny wells were apparently usually excavated by "skin divers," scooping out the interior sand whilst holding their breath under water, and were therefore of quite small dimensions.

The name "monolith" is applied to these large piles though the term really means "columns of one stone," but they are usually constructed of concrete and form one whole mass, whether consisting of one, two, three or four compartments, each compartment being usually spoken of as a "pocket" or "well." Thus a monolith with four compartments pitched due

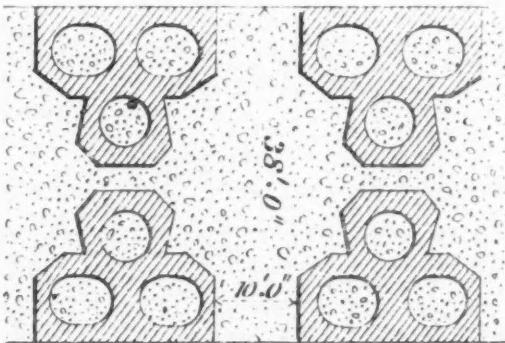


Fig. 2. Plan of "clover leaf" pattern monolith.

east and west would have a N.E., a N.W., a S.E., and a S.W. well.

Originally wells were used simply to carry uniform loads, and were sunk in positions where uniform support on all sides could be given, but in more recent times this method of

construction has been adapted to structures, such as wharf walls, where the weights are not uniform, and with water the only support on one side; i.e., the monolith is subject to considerable side pressure, and problems of overturning moments and toe pressures are added to the problems of support. Under these conditions monoliths have to be designed so as to be deep enough not to slide forward owing to pressure at the back, to be founded on hard enough material to take the front toe pressure, and to be sufficiently deep to give support to the super-imposed weight by skin friction of the sides plus the support of the base.

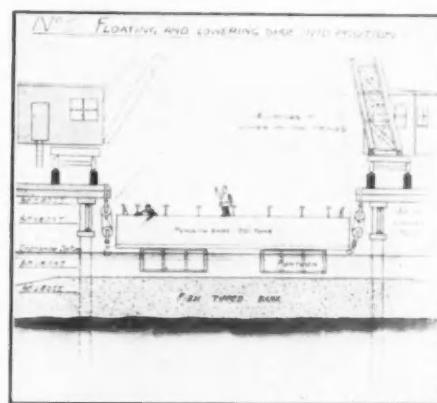


Fig. 3. Placing monolith shoe in position prior to sinking.

The monolith type of foundation is particularly adapted to marine works, and has been used in all the more important dock and harbour works of recent years. They suit the conditions usually experienced in marine engineering, as these works are frequently constructed where foundations have to be built on alluvial deposits in estuaries or sandy shores of the sea. They are naturally below the water level, where open trenches are next to impossible.

The design of foundations under such adverse conditions is a somewhat expensive matter, as a very complete exploration of the site is a first and very necessary preliminary. This exploration of the sites necessitates the taking of a large number of borings, and upon the accuracy and careful record of these borings much depends, not only in forming an estimate of the cost, but in the economical design and construction of the work.

A word of warning in regard to these preliminary borings is necessary. They frequently pass through strata which may be either impervious or water bearing, and old bore holes on the site of monoliths have often been an annoyance should it be necessary to pump out the monolith during its sinking. The bores should therefore be made as near to, but clear of, the spot where the monoliths are to be constructed.



Fig. 4. Shuttering in position on base of monolith.

The information furnished by these borings enables a judgment to be formed as to the porosity of the beds through which they pass, the density or hardness of the beds, the probable depth to which the monolith must be sunk to get the best foundation, and the uniformity of the beds over the area on which the future walls are to be erected. Should the bores indicate variation in the material passed through it is a great benefit to have a bore at each monolith, as this furnishes most useful information when sinking operations are in progress.

\* Reproduced by kind permission of the Junior Institution of Engineers.

† Transactions for 1898-1899, Vol. IX. p. 129.

## Monolith Foundations—continued

The density of the various beds furnishes material for the design of the shoe of the monolith. In a few cases flat bottom shoes, 1-ft. or more in width, have been used; this is an impediment to the easy sinking of the monolith, and I cannot do better than quote from a report by Sir John Wolfe Barry and myself when we were called in to advise the Calcutta Port Commissioners in regard to their King George's Dock scheme:

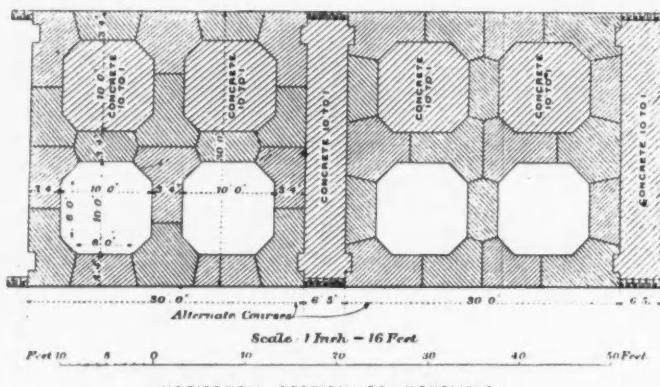


Fig. 5. Plan of two adjacent monoliths at Tilbury showing intermediate space filled with concrete.

"We are not in favour of a flat bottom shoe; our experience is that a sharp cutting edge is more advisable and safer. The latter form of shoe, in our opinion, facilitates sinking, and in the process tends to keep itself buried and ahead of the excavation in the pockets, lessening the possibility of adjacent soil and water rising in the monolith. This is of much importance in strata that may be water-bearing, as the sharp cutting edge, passing easily and rapidly through the strata, cuts off any sand and water from the interior of the monolith more efficiently than can be the case with a shoe flat at the bottom.

"We do not attach much importance to the argument in favour of a blunt shoe of being able to stop the sinking of the monoliths more correctly at a specified depth; we think that this question is far out-weighed by the greater ease and rapidity of sinking with a sharp cutting edge and the increased safety against blows of sand or water." The designs of shoes have varied greatly. In the small wells used, for many years in India it was customary to have a wooden V-shaped curb. At Keyham Dockyard a concrete cutting ring was adopted, in which two bands of 4-in. by  $\frac{3}{4}$ -in. iron were embedded. At Rosyth, owing to the great variety in strata to be passed through very heavy steel shoes, 5-ft. deep and weighing from 50 to 60 tons, were adopted, but even these heavy shoes were at times severely crippled after meeting rock or obstructions like glacial boulders which were scattered through the varying strata. (Fig. 1). At Calcutta, where the material was fairly uniform, shoes of half that weight were sufficient, and at Vizagapatam, where still more favourable conditions existed, the shoes were cut down to a mere skin and a  $1\frac{1}{2}$ -in. cutting edge.



Fig. 6. Monoliths deflected during sinking.

The consideration of the form or plan to be adopted is very important. At Keyham Dockyard a clover leaf pattern was tried consisting of three wells, each 6-ft. 6-in. internal diameter and with 2-ft. thick walls; they were approximately 18-ft. across. In the thicker walls a double row was put in, as shown in Fig. 2, making 38-ft. in width. Generally these were sunk without serious difficulty, though at times as much as 900 tons of kentledge was required to force down a single monolith. They varied in depth from 60 to 100-ft.; it was therefore natural with such long thin structures to experience difficulty in keeping them straight, and great care was necessary in the lower depths, as if once they got out of the vertical it was impossible to prevent them going further astray.

This trefoil form has not been adopted elsewhere, and rectangular monoliths have been almost exclusively used. Again quoting from the report to the Calcutta Port Commissioners previously mentioned:—

"In our experience plain rectangular monoliths with rectangular holes of the largest dimensions possible with due regard to strength of their walls have proved the most suitable and easy to manage.

"We are not in favour of monoliths polygonal or circular in plan. Such shapes may be unobjectionable for the piers of a bridge, in which cases the vertical load may be regarded as equally distributed. But they are inappropriate for the walls of a dock or lock in which side pressures, due to external forces, cause an unequal distribution of stresses. For such purposes rectangular monoliths are much more suitable."

The monoliths at Rosyth Dockyard were designed to be 43-ft. square with 4 holes, pockets or wells each 18-ft. square, the outside walls being of concrete 6-ft. thick, and the interior division wall 5-ft. thick. The work was not, however, carried out with 18-ft. square wells, as the contractor was given permission to place kentledge as an inside lining which reduced the compartments to 10-ft. square. This expedient had both advantages and drawbacks; it certainly saved considerable cost and time in moving kentledge and also saved interior shuttering to the concrete walls as the concrete kentledge was made in precast blocks, which were built up to serve as shuttering, but these concrete blocks were ineffective as kentledge unless the wells or pockets were pumped dry, and this necessitates the building on top of each compartment a steel cylinder to exclude the high tide, when the monoliths were near founding level. Pumping the wells dry also caused serious blows of sand and water, causing great disturbance to the surrounding ground and sinkage of the staging as well as great delay owing to the necessity of leaving the monolith till the "live" nature

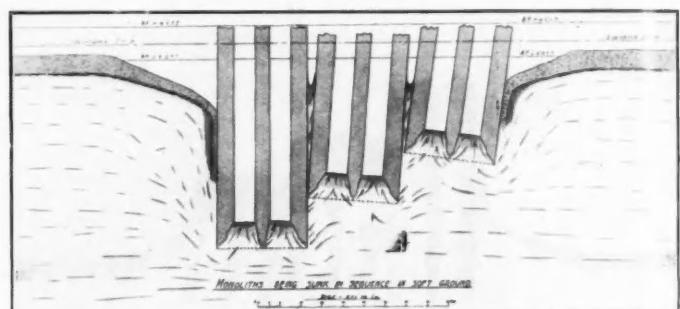


Fig. 7. Diagram of monoliths sunk in sequence in soft ground.

of the surrounding ground had become static, as was necessary before sinking could be recommended. It also increased the difficulty of excavating the wells, the grabs being only able to pump 100 square feet instead of 170 square feet.

In order that the finished work may be in the correct alignment and position it is necessary that the shoe of the monolith is "pitched" in its exact position and perfectly level. Should the site be in the dry and consist of uniform firm material this operation is not difficult, but in many instances, as in tidal waters, the bed is too soft to carry the weight of the shoe and its enclosed concrete without sinking, and it is impossible to guarantee that the sinking will be so uniform as to allow the shoe to descend truly level. To guard against an incorrect beginning a bed of ashes has been used when working in the dry, or of sandy clay where the site is in tidal waters. Even with the aid of this "firm bank" it is not an easy matter to pitch a 60-ton shoe in correct position and dead level as it rests on a sharp edge, and no wood packing can be allowed as this would disturb the even sinking after the pitching was accomplished.

At Rosyth, after tipping a carefully levelled firm bank, the contractor floated the shoe on pontoons into position at high water when its weight was taken by sets of 30-ton pulleys attached to the staging. The wire rope from each set of pulley blocks was manipulated by a separate crane, so that after the pontoons were taken away the shoe could be gently lowered into its exact position. (Fig. 3). After this operation, the steel shoe was uniformly filled with concrete and the timber shuttering placed in position to carry up the concrete walls of the monolith. (Fig. 4). At Vizagapatam, where the shoes were not too heavy to be man-handled, they were built on wood packing, and this was gradually removed until the shoe rested on a sandy bottom properly levelled to receive it.

To make a continuous wall the separate monoliths, after being sunk, must be joined together. This is effected by excavating the space between two adjoining monoliths and filling with concrete. The distance apart of the monoliths must therefore be such as will readily permit of this being done. At Keyham a dimension of 6-ft. was first adopted for the width

*Monolith Foundations—continued*

of the spaces between adjoining monoliths; this was afterwards increased to 10-ft. as it was thought this facilitated sinking, but 10-ft. was an extreme width owing to the difficulty of supporting the sheet piling driven across the ends of the space to enable the excavation to be carried out. A 6-ft. 5-in. space was adopted at Tilbury (Fig. 5), whilst at Rosyth and Calcutta 6-ft. was used, and at Vizagapatam a 5-ft. space was adopted.

It has been argued that much smaller spaces might be possible, but there are two factors to be considered. One is the difficulty of men working effectively in a space much less than 5-ft. 5-in. wide which may be 50 to 60-ft. deep, and very small grabs would be necessary for mechanical excavation. The second factor which governs the width of the space is the difficulty of sinking monoliths accurately. Though some monoliths can be put down with surprising truth to line and level, others, for no apparent reason, become intractable, and a few inches out of plumb in the first 20-ft., if not corrected at that depth, is apt to be 2 to 3-ft. at a 60-ft. depth; whilst should the monolith drift so far as to touch its neighbour in descending, nothing can be done to sink it further except to cut away the first monolith—a very expensive and slow operation. Fig. 6 shows monoliths thus deflected. Also there is the fact that a monolith being sunk adjoining one already down tends to draw towards the deeper one (Fig. 7), possibly because the first monolith slightly loosened the strata, and there is therefore a little less resistance on the side next to the lower monolith.

For this reason monoliths are never put down consecutively, but alternate monoliths are first sunk, and then the intermediate ones are taken in hand; by this means a balance is established which enables the intermediate monolith to be sunk without bias.

There still remains to mention that, with a reasonably wide space, the importance of lateral drift of the monolith is neither serious nor dangerous, and as it is very necessary to keep the monolith to the front line, the sides are frequently left to take care of themselves, as it is much more difficult to try and overcome drift in two directions at the same time than one only. A space of 5 to 6-ft. is, for these reasons, a safe one, and in practice has been found to be suitable.

The sinking of monoliths is not an exact science, and almost every case requires some special treatment. There are, however, a number of considerations applicable to all sinking.

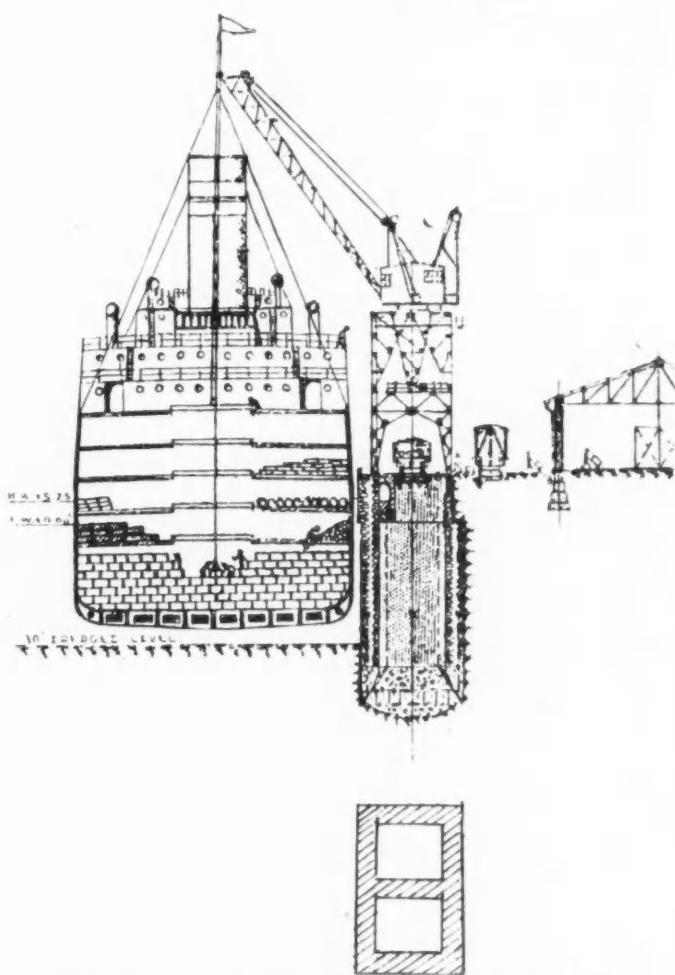


Fig. 8. Sectional plan and elevation of monoliths forming quay wall at Vizagapatam.

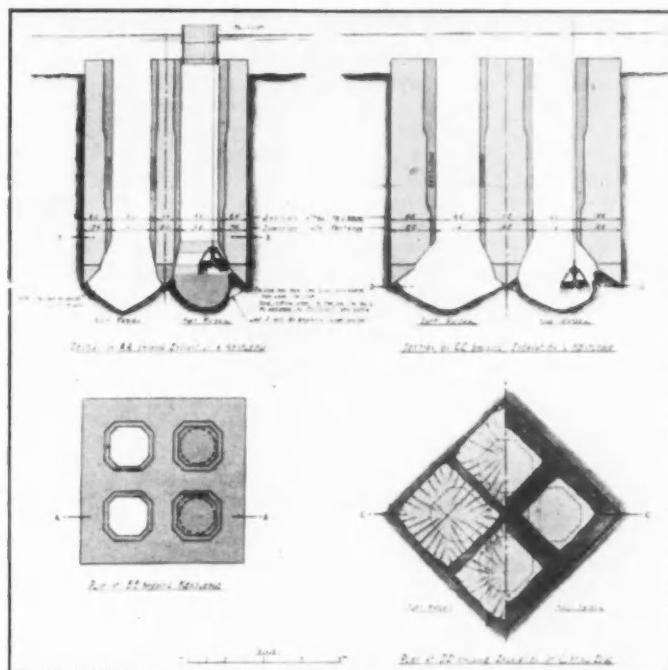


Fig. 9. Sectional elevation and plan of monolith wells being excavated by means of grabs.

First let me emphasise the necessity of knowing at all times the level of the cutting edge of the shoe. The method adopted at Vizagapatam to accomplish this was to mark in white paint every foot on the masonry at each corner of the monolith as soon as it was built, and twice a day levels were taken at each corner of every monolith. The amount of sinkage at each corner since the last levels and the work being done on the monolith, such as excavation of pockets, building of walls, etc., is recorded, and enables the engineer to guide the work of sinking so as to keep the monolith level, or reveals some unknown factor which has to be overcome. Once a monolith has

been started it should be kept steadily sinking until it is founded. It is a mistake to suspend operations as the monolith tends to become set, and considerable extra weights or extra excavation are necessary to start it moving again.

The simplest form of sinking is to so design the thickness of the walls of the monolith as to give considerable excess weight above the skin friction, then the excavation of the inside will frequently allow the monolith to sink by its own weight. This was the happy case at Vizagapatam (Fig. 8), where the materials to be sunk through were very uniform and easy to remove. For the first 20-ft. a soft watertight clay was met with, and excavation in the dry was carried out by coolies, the lumps of clay being hoisted out in baskets and carried ashore by women. A 1½-in. petrol-driven Evinrude pump working for a few minutes was sufficient to keep each pocket dry. Very uniform excavation and sinking was possible, and the monoliths were got down 20-ft. with not more than 2 to 3-in. of variation except in one case where the contractor, in order to employ his masons, built the monolith to an inordinate height when the shoe was only a few feet in the ground. The centre of gravity was therefore high, and a very little variation in sinking brought considerable extra weight on the low side and a tilt of nearly 2-ft. It was corrected by excavation on the high side only, but as this was slightly overdone, the monolith finished 5 or 6-in. in the opposite direction. When the water broke through the bed of clay the coolies were withdrawn, the water allowed to rise, and the excavation was continued by a grab. It is not easy to excavate uniformly with a grab working in the dark, but by counting the grabs and removing the same number of loads from each pocket and by frequent sounding fairly good results were obtained, the majority of the monoliths being sunk to their full depth with a variation of not more than 6-in. out of line and with not more than 100 tons of kentledge which was not necessary in all cases. Fig. 9 indicates the method of excavating by means of a grab.

One monolith gave considerable trouble as it met a thin streak of gravel which extended only over half the area of the shoe; it quickly fell away on the soft side and was 18-in. out of place. By loading the high side with 200 tons of cast-iron kentledge blocks, by partly pumping out the pocket and by excessive grabbing the monolith was got down to full depth but still remained leaning 1-ft. 6-in. out

**Monolith Foundations—continued**

of place, fortunately the principal variation was in the closing spaces, one being 3-ft. 6-in. wide at the top, and the other 6-ft. 6-in. Generally it may be said to be easy to correct irregularities in sinking for the first 20-ft. For the next 20-ft. this can only be done with great difficulty, and after 40-ft. it is usually impossible to correct variations, indeed, they more often aggravate their displacement.

Another method of sinking is to carry it out entirely in the dry, which is only possible where the strata is such as not to produce more water than can readily be pumped out. This method has the advantage of increasing the weight of the monolith as the buoyancy given by the water is removed. Greater accuracy of excavation is possible, but there is a liability to sudden blows of water bearing sand, indicated in Fig. 10. At Rosyth, where the contractor largely adopted this method, numerous blows occurred, in some cases so suddenly as to jeopardise the workmen, the water and sand filling the pocket as quickly as the men could climb the ladders. These blows seriously disturb the surrounding ground, produce great settlement, let down the staging, necessitate a new blanket of clay as well as the leaving of the monolith for some weeks before further sinking can be attempted.

Where monoliths have to be founded on rock, working in the dry is essential, as rock is rarely level enough to found upon without some cutting away, and this must be done to clear the outside of the shoe if the monolith is to be got to a lower level in order to reduce the underpinning as much as possible.

A method of accelerating sinking is by blasting—the contractor at Rosyth tried a system of what he called "bomb firing." Charges of 4 to 5 lb. of "blastine" enclosed in a tin canister were lowered through the water and exploded near the level of the shoe. This explosion had the effect of shaking the monolith and slightly lifting it, after which it generally dropped two or more feet. This method proved effective after other things had been unsuccessfully tried, and was only adopted with obstinate monoliths. Damage was occasionally done to the monolith, and after this had occurred the contractor was required to limit the charges and reduce the tamping by lowering the water in the wells when bomb-firing was taking place.

When the monolith has been sunk to the required depth, the slurry is usually pumped out and the excavation below the shoe filled with broken stone levelled off by divers, after which concrete is deposited in self-opening skips, or if the wells can be pumped out by deposit in the dry.

As I have already indicated, pumping out of monolith wells is accompanied by a risk of "blows"; to guard against these as much as possible, it is advisable to pump out slowly, and if powerful pumps are in use these should be stopped at intervals; should the water rise rapidly, this is a sure indication of the probability of a blow.

After a long experience I strongly advocate the sinking of monoliths in the wet, and feel it is money well spent to overcome the resistance to sinking by kentledge rather than increase the weight by pumping out with its attendant risks.

Before closing, let me say a few words as to the principal impediment to the sinking of a monolith, that is, the support given by the surrounding ground to the sides of the monolith. This is usually spoken of as skin friction. When the trial

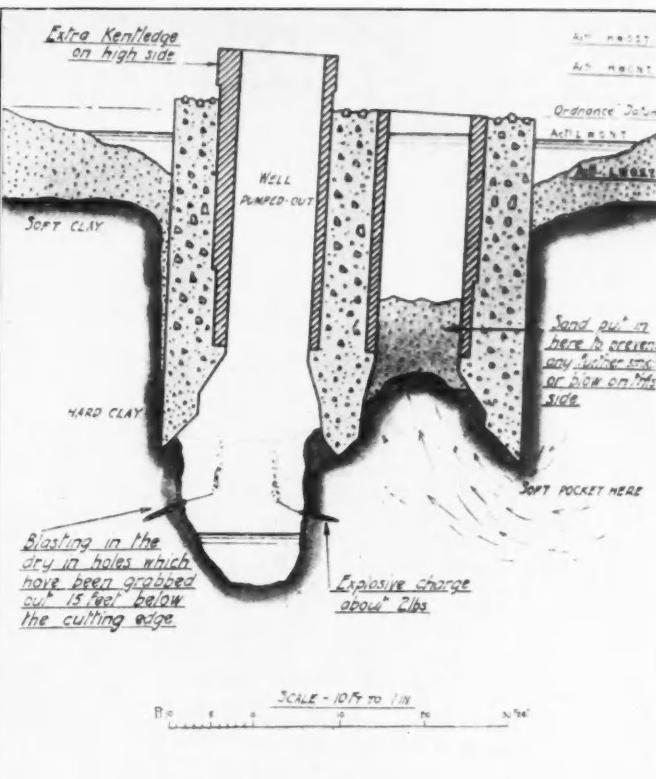


Fig. 10. Sectional elevation of monolith excavated dry showing at right a blow of water-bearing sand.

cylinder was sunk at Rosyth very careful observations of kentledge, etc., were taken, from which it was deduced that a skin friction of 4 cwt. per foot super might be anticipated. This is possibly a low figure, as the cylinder was of cast iron and had a very smooth surface; it might be expected to be greater where a rough concrete surface was substituted for an iron one.

Mr. Du Plat Taylor gives figures to indicate that at Tilbury as much as 8 cwt. per foot super was encountered. He attributes this high figure to the resistance offered by the character of the peat which formed a large portion of the strata through which sinking took place. He also says the measure of the friction was between clay and clay, etc., and not between concrete and clay, indicating that the shearing value of clay, etc., was less than the friction between concrete and clay. Cases have been known where the skin friction has been greater near the surface than at a lower level as might be found with a soft bed of clay at a low level. In such a case the upper part of the monolith becomes suspended, the lower part only going down. This is an occurrence to add another nail to the engineer's coffin. I have not had an experience of that sort, but from the details I have been able to give you, I think you can deduce that sinking of monoliths is one long-drawn-out anxiety.

**Bombay Port Trust**

At a meeting of the trustees of the Port of Bombay held on 19th May, 1931, the following were the main items of business disposed of:—

An estimate of Rs. 16,000 for special repairs to the hydraulic cranes at Alexandra Dock was sanctioned against the relative Budget provision.

An estimate of Rs. 5,555 for providing 155 refractors to the electric lights at Cotton Depot was approved; these refractors, while improving the lighting of the roads, will considerably reduce the current consumption, the resulting saving under this head being estimated at some Rs. 8,000 a year.

A final additional expenditure of Rs. 27,741 for completing the special repairs to the Prince's Dock entrance gate was sanctioned.

The Board accepted the tender of Messrs. F. K. Mody and Sons for the supply of 2,100 cubic feet of Burmah teak railway crossing timbers for maintenance renewals on the Bombay Port Trust Railway during 1931-32, this being the lowest tender for timbers up to the required standard.

In connection with the paving and roofing of Ballard Pier Station, the estimated cost of which, Rs. 2½ lakhs, was sanctioned by the Board and Government in 1929, the Board considered letters from the G.I.P. and B.B. and C.I. Railways intimating that the Railway Board had approved the proposal that those railways should levy and collect on behalf of the

Port Trust a surcharge of Rs. 3 on every first-class ticket to or from Ballard Pier, Rs. 2 per second-class and Rs. 1 per third-class, in order to recoup the Port Trust the interest and sinking fund on the outlay involved. It was resolved to put the work in hand immediately subject to the approval of Government to the levy of the proposed surcharge with effect from 1st January, 1932.

At a meeting of the Trustees of the Port of Bombay held on 2nd June, 1931, the following were the main items of business disposed of:—

The nomination of Col. W. M. Macleod as a Trustee vice Major-General G. A. Weir, who vacated command of the Bombay district on 30th May, was recorded.

The Board considered tenders for the construction of a combined Steam Anchor Hoy and Fire Float to replace the existing vessel which has been in commission for 35 years and is past further service. The duties of the vessel are threefold—(1) placing and lifting of buoys, moorings, anchors, etc.; (2) supplying fresh water to shipping in the stream, and (3) salvage work and assistance at fires. The lowest tender, that of Lobnitz and Co., Ltd., Renfrew, was accepted. The dimensions of the new vessel will be as follows:—Length, 115-ft.; breadth, 32-ft.; depth, 12-ft.; draft, 7-ft. 9-in.; speed, 8½ knots twin-screw; tank capacity of fresh water, 110 tons; capacity of fire pump, 2,000 gallons per minute.

The cost delivered in Bombay and inclusive of Customs duty is estimated at Rs. 3,82,603.

## Scottish Notes

### Government Grant Refused for Dunbar.

DUNBAR TOWN COUNCIL some time ago made application for Government assistance towards the repair of the local East Pier, and intimation has now been made by the Unemployment Grants Committee that—as the proposed work is ordinary maintenance and repairs—no money is available for this purpose. Keen disappointment is felt locally at this decision, and the Town Council is now approaching the local member of Parliament—Mr. George Sinkinson—in the hope that something might be done in the direction of obtaining a grant. It is felt locally that the renovation scheme proposed for the East Pier would be helpful and beneficial to the community, and it is hoped that this matter will be re-opened through Mr. Sinkinson's good offices.

### Reconstruction of Quays at Fraserburgh.

At a recently-held meeting of Fraserburgh Town Council consideration was given to a letter from Fraserburgh Harbour Commissioners asking the local authority to grant collateral security on the rates for a loan of £13,500 from the Development Commissioners for the reconstruction of quays. The Town Clerk stated that H.M. Treasury had offered a grant of £13,610 and a loan of £13,500 for the reconstruction of the breastwork of the quay in Balaclava Harbour in front of the ice factory; for the strengthening of the south side of Provost Anderson's Jetty; and for the construction of a concrete wall along both sides of the Middle Jetty. The loan of £13,500 was to be repayable in 30 years, and no principal or interest would be asked for the first five years. The Harbour Board proposed to set £934 aside annually as a reserve to meet the obligation.

In the course of a general discussion Provost Walker (stressing the urgency of this matter) expressed the view that this work was absolutely essential, and that it was very desirable that it should be proceeded with as quickly as possible. Councillor Thompson also thought the necessary guarantee should be given, but he felt that there was an element of risk in giving collateral security. He pointed out that at present Fraserburgh Harbour was committed to an annual obligation of £21,500, and that this would raise it, five or six years hence, to £23,000 to be found from revenue. He suggested that the reserve fund should never come below £950 per annum except with the consent of the Town Council. He moved accordingly, and this motion was agreed to, and a special resolution passed to pledge the rates to the extent of £13,500 as expedient for the benefit of the inhabitants at large.

### Dredger Launched at Leith.

On the 28th May, there was launched from the Victoria Shipyard, Leith, of Messrs. Henry Robb, Ltd., a motor grab dredger, the "Sheila of Penryn."

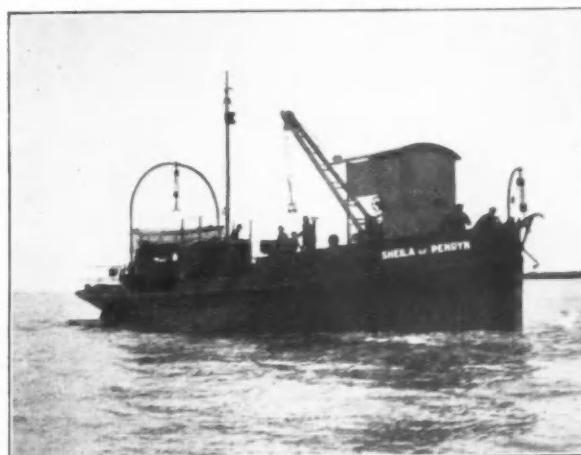
The vessel was launched with the main propelling and dredging equipment fitted out complete. After the vessel had entered

the water the machinery was started up and the vessel proceeded to Leith Harbour where the dredging trials were carried out during the afternoon. On Friday, 29th May, the vessel proceeded to the measured mile on the Firth of Forth and there carried out very successful speed trials.

This vessel has been specially designed for working in small harbours on a comparatively light draught. The main particulars are as follows:—

Moulded Dimensions, 67-ft. by 18-ft. by 7-ft.; Hopper capacity, 70 tons; Load draught, 6-ft. 6-in. maximum.

Accommodation is provided for the crew in a roomy cabin. Navigating bridge is provided immediately abaft the hopper, complete with hand steering gear, etc.



The "Sheila of Penryn."

Main propelling engine consists of one 60/80 b.h.p. Gleniffer 4-stroke Diesel engine which is arranged with reduction gear on the propelling shaft. Speed: During the loaded speed trials a mean speed on full power of 7.12 knots was obtained.

Dredging equipment consists of one Priestman grab which is operated by a petrol-driven engine. The grab has sufficient radius to allow of the vessel cutting her own flotation. During the dredging trials it was found that the grab could easily fill the hopper within the contract time.

The vessel has been constructed to the order of the Town Council of Penryn, Cornwall, and will shortly make the journey from Leith to that port under her own power.

The comparatively small dimensions of such a vessel make it suitable for small harbours; and as the vessel can be operated by two men inside harbours, this makes it, in addition to the low initial cost, a very economical unit for Harbour Boards.

## The Port of New Orleans

Business on the Inner Harbour Navigation Canal was better during May than any time in its history, according to figures compiled and released by the Dock Board. During the month 1,273 vessels having a tonnage of 476,224 tons used this facility. This represented an increase of 461 vessels and 169,848 tons, as compared with May, 1930.

There was an increase of 43 vessels in arrivals, during May, of inland watercraft having a tonnage of more than 25 tons.

Seagoing vessels numbering 212 arrived in port during the month of May, 1931. There were 205 departures of such vessels.

The sea-going vessels arriving during the month had a total gross tonnage of 830,062 tons. The gross tonnage of vessels using the public wharves was 697,931 tons. Cargo paying tollage amounted to 319,449 tons. This represents an increase of about 70,000 tons over the previous month of the current year and indicates a steady and encouraging improvement in the Port's business.

During May, 1931, the import of ores, chemicals and their manufactures increased 7,092 tons over the previous month. The imports and exports of vegetable food products increased 3,513 tons, and 9,966 tons respectively. Machinery and vehicles exported increased 120 tons.

The importation of bananas was practically normal. During the month 1,762,021 bunches were received.

As usual the majority, both in number and tonnage, of sea-going vessels arriving were of American registry. Of the 212 sea-going vessels arriving, 122 flew the American flag. Honduras was second in number and tonnage, while Norway was third in number and Great Britain third in tonnage.

Following is a tabulation of sea-going vessels, showing number, gross tonnage and arranged by nationalities, which arrived during May, 1931:—

Nationality	No. of Vessels	Gross Tonnage
American	122	477,982
British	10	76,307
Brazilian	2	9,871
Belgian	1	4,965
Danish	1	2,779
Dutch	3	17,062
French	1	5,985
German	3	9,988
Honduran	37	109,015
Italian	5	29,025
Japanese	3	19,832
Nicaraguan	2	1,116
Norwegian	12	32,684
Panaman	4	9,074
Spanish	2	13,101
Swedish	4	11,276
	212	830,062

## Canadian Notes

**A**CCORDING to the journal "Shipping Register" (Montreal), thousands of navigation aids have recently been distributed by the authorities along Canada's inland and ocean shore line.

On the Great Lakes alone, 5,300 lights, buoys and other navigation aids are being placed where they will warn mariners of shoals and shallow water during the coming season.

Along Canada's total coast line of 52,800 miles, no less than 11,000 beacons will protect the shipping routes during the coming year. In the entire Canadian service there will be 1,675 lighthouses, 362 fog stations, 556 gas and signal buoys, 6 submarine bells, 12 lightships, 8,310 unlighted buoys, beacons and day marks.

### Quebec Harbour Commission.

The Quebec Harbour Commissioners have forwarded to the reference library at Canada House, Trafalgar Square, London, S.W.1, their Report for the year 1930, giving up-to-date information relative to the facilities available for shipping in the port, and showing a further progress in the utilisation of the harbour accommodation during the nine months of navigation last year. Navigation opened on March 8th and closed on December 23rd.

The traffic decline reported in 1929 was slightly arrested last year, exports rising by 10 per cent. and imports showing also a slight improvement.

The report can be consulted at Canada House, by engineers and others interested.

### The St. Lawrence Ship Channel.

In a statement published by the journal "Shipping Register" (Montreal), the Hon. Alfred Duranleau, M.P., Minister of Marine of Canada, is reported as saying that within a comparatively few years he believed the St. Lawrence Ship Channel would be able to accommodate the largest liners now entering the Port of New York.

### Large New Dredge for the St. Lawrence Ship Channel.

There was launched on April 18th last at the shipyards of Canadian Vickers, Limited, at Maisonneuve, Montreal, a powerful new addition to the St. Lawrence dredging fleet. The vessel, to be named the "Midland," has been built for the Canadian Dredging Company and is of the dipper type, equipped with two buckets capable of handling 8 cubic yards of heavy material or 10 cubic yards of light material in one operation.

The dredger is believed to be the largest craft of its kind now in Canadian waters, being 130-ft. in length between perpendiculars; moulded breadth of 43-ft.; moulded depth 13-ft. 6-in.; and draught 8-ft. 4-in. The craft's dredging arm will enable it to operate in 50-ft. of water. Power for dredging operations is provided by two oil-burning boilers, and there is accommodation on board for a crew of 25. Canadian Vickers Limited constructed the "Midland" in the space of 100 days.

Last year, a fleet of 11 dredgers worked on the St. Lawrence Ship Channel between Montreal and Quebec, and several more, including the new vessel "Midland," are expected to be added this season. A channel 500-ft. wide on the straight stretches and 1,000-ft. wide on the curves is being cut to a depth of 35-ft., which will afford free passage 1,000 miles inland to Montreal for vessels of more than 20,000 tons gross.

### Port of Montreal.

After a period of hibernation extending only a little more than 4 months, the Port of Montreal is once again transacting its usual shipping business.

The first ocean-going liner arriving in the port was the C.P.R. s.s. "Duchess of Richmond," which entered the harbour on April 19th. The first ocean-going vessel, however, reaching the port this season was the British oil-tanker "Acardo," which arrived on April 15th from Curacao (Dutch West Indies).

The early opening of the port this year must be attributed not only to the comparatively mild winter conditions experienced, but to the greater efforts now being made to extend the safe period of shipping from St. Lawrence ports. Last November and December the fleet of ice-breakers stood by ready for use in emergency until the last vessel had safely reached the ocean, and this spring they were early at work pounding at the rotting ice in the river. Actually, steamer arrivals could have been scheduled much earlier than the date on which the "Duchess of Richmond" reached the port. The ice-breakers "Mikula" and "Saurel" reached Montreal East on March 14th, and the "Saurel" and the "Lady Grey" arrived at Victoria Pier 5 days later, when the St. Lawrence

river was officially declared open. Navigation aids were being placed in the river on April 1st.

Thus, the Port of Montreal was closed to passenger liners for 141 days, or 20 weeks, the last transatlantic passenger ship sailing in 1930 having been the "Alaunia," "Doric" and "Montcalm," which left on November 28th. Actually, however, navigation was closed for no more than 123 days, or 17 weeks, as the "Cabot Tower" sailed on December 12th last and the oil tanker "Acardo" reached the port this year on April 15th.

The "Duchess of Richmond" did not, however, achieve a record for an early transatlantic arrival, as on April 17th, 1927, the s.s. "Laval County," a freight steamer, arrived at Montreal, opening navigation for that year. This year is, however, the first since the war in which the port has been opened by a passenger liner, the s.s. "Corsican" having been berthed on April 29th, 1914.

### Grain Shipments on the Great Lakes.

The "Shipping Register" (Montreal) states that the huge grain elevator built by the Canadian Government at Prescott, Ontario, has been completed, and that arrangements have been made for it to be ready for the opening of navigation on the Great Lakes in April.

The building, which has been under construction for two years, is 205-ft. high, 1,340-ft. in length and stands on land reclaimed from the St. Lawrence River. The new elevator establishes Prescott as an eastern terminal for the large grain carriers from Lake Superior, whose range of navigation has been extended with the completion of the new Welland Ship Canal.

### Canal Traffic in Canada, 1930.

The Dominion Bureau of Statistics at Ottawa has forwarded to the Natural Resources and Industrial Information Branch, Office of the High Commissioner for Canada in London, its Canal Statistics for the year ended December 31st, 1930, which can be consulted by persons interested at Canada House, Trafalgar Square, S.W.1.

According to this volume, the traffic through the Canadian and United States locks at Sault Ste. Marie declined to 72,897,895 tons, a drop of 19,719,003 tons. The reduction is attributed mainly to decreased handling of iron ore, the 1929 record total of 64,915,575 tons having declined by nearly eighteen million tons to 47,050,479 tons. Bituminous coal also decreased by 1,842,272 tons, but there was an increase of 560,244 bushels of wheat.

Traffic on the Welland Canal was less than the record of 1928, but higher by 1,318,004 tons than the 1929 figure, the decline being due mainly to decreased wheat shipments. During the navigation season, traffic between Lake Ontario and Lake Erie followed the new Welland Ship Canal to above Lock No. 3, thence via the Older Welland Canal to above Thorold, where the new Ship Canal was again entered, and followed to Port Colborne. Progress on the flight lock section permitted down-bound traffic from September 10th to follow the Ship Canal throughout, and towards the close of the season enabled all traffic to be accommodated in the Ship Canal. Nevertheless, the restricted channels and unforeseen delays in the delivery and completion of necessary safety devices and equipment limited the use of the Ship Canal generally to vessels of the St. Lawrence Canal dimensions (maximum length 255-ft., beam 44-ft. and draught 14-ft.), although towards the end of the season such vessels were permitted to load to 18-ft. draught. It is anticipated that, towards the end of May, 1931, upper lake vessels not exceeding 450-ft. in length drawing up to 18-ft. will be able to use the Ship Canal and later in the season all upper lake vessels up to 20-ft. draught. The maximum draught allowable when the canal is completed will be approximately 25-ft. The upper lake vessels, however, are at present restricted to 19 or 20-ft. by the channels in the Detroit and St. Mary's rivers, and navigation below Prescott is limited to 14-ft. by the St. Lawrence Canals.

On the St. Lawrence Canals traffic totalled 6,179,023 tons, including 5,163,020 tons of through freight and 1,016,008 tons of way freight; through traffic increased by 570,708 tons mainly accounted for by wheat shipments.

### Official Opening of the Welland Ship Canal.

The "Shipping Register" (Montreal) states that, according to advices received from Ottawa, the official opening of the Welland Ship Canal took place on July 1st.

### Navigation on the Great Lakes.

According to a statement recently made by the Hon. Alfred Duranleau, the Canadian Minister of Marine, the United States Government has undertaken to carry out dredging operations

## Canadian Notes—continued

in the Thousand Islands stretch on the St. Lawrence River, removing shoals between Clapton and Alexandria Bay, and also east of Alexandria Bay. The work will be finished by the Autumn, and in the meantime a well-lighted detour will be provided between Clapton and Prescott. Ships drawing 18-ft.—the depth recommended for the Upper Lakes this season—will be able to discharge their cargoes at Prescott, only 120 miles from Montreal. Thus the sailing radius of lake craft has been increased from 1,000 miles to 1,400 miles by the extension of their eastward journey from Port Colborne to Prescott.

Two powerful beacon lights, each of 50,000 candlepower, will be erected this summer at the upper and lower entrances to

the Welland Ship Canal, and in addition an electric horn will be built.

## Annual Report of the Port of St. John, New Brunswick.

The High Commissioner for Canada in London has received from Saint John Harbour Commissioners a copy of their Report for the year ended December 31st, 1930, showing a decline of about half a million tons in exports during the year, and an increase of about 185,000 tons in imports. Notwithstanding the decreased volume of grain handled, there is a marked evidence of a gradual increase in the port's overseas and coastwise shipping, and the report gives data relative to several interesting developments in harbour facilities during the year.

## Irish Harbour Matters

## Limerick.

## Limerick Harbour Board and Shannon Levels.

FOLLOWING the reported intention of the Electricity Supply Board to create a storage reservoir for the Shannon supply in case of a dry season, by lowering the level of Lough Ree, Westmeath, Mr. T. E. Goodbody, at a meeting of Limerick Harbour Board, stated that the lowering of the Shannon levels north of Athlone would deprive Limerick of a considerable volume of business. The Westmeath County Council had passed a strong resolution on the subject and he thought that the Limerick Harbour Board should take similar action. The question was of serious importance for Limerick, as if the proposed works were carried out, Limerick would suffer another serious interference to her trade and commerce.

Mr. P. Bourke, the chairman, agreed.

Mr. Loughrey said that Limerick timber merchants had large business interests in the area affected. Limerick had already suffered heavy losses as a result of the dislocation of inland navigation. If further interruption took place, trade now held by Limerick would be captured by Belfast—a very serious consideration.

## Dublin.

## Dredging of Balbriggan Harbour.

The Commissioners of Public Works have informed the Dublin Port and Docks Board that the dredging of Balbriggan Harbour will be done at the usual cost of £17 per day, provided the Port Board took full responsibility for the cost of the dredger.

Mr. C. E. McGloughlin (chairman), in reply to Mr. Wm. Field, said that hitherto the Government had always paid half the cost. It was stated that the condition of the harbour was such that coal boats were unable to get in or out, except at particular tide times.

It was decided that the chairman and secretary (Mr. Bailey) should meet the Minister for Lands and Fisheries with a view to having the Government grant continued.

## Cork.

## British and German Liners at Cork Port.

Mr. Romayne Harman, agent for the White Star Line at Cobh (Queenstown) recently took exception to statements made by the chairman of the Cork Harbour Board (Mr. Wallace) in regard to the official welcome given the North German Lloyd liner, "Columbus," which called at Queenstown for the first time after a world voyage.

Mr. Harman stated that Mr. Wallace was reported as saying that the British lines had let down the Port of Cork, but he thought if the facts were examined that this was not the case. He referred to the situation of the trans-Atlantic traffic which made it necessary for the British lines to transfer their big ships from Liverpool to Southampton, and reminded the Board that the Liverpool-Queenstown service was not neglected, since the weekly service was still maintained by British lines which were still the best customers of the port, proved by the fact that they had landed five times as many tourists as all the other lines combined, operating from Queenstown.

Mr. Wallace, in reply, said that the Harbour Commissioners looked upon their responsibilities from the angle of the welfare of the port. His statements were made out of rejoicing that the port was being visited by a liner of approximately 33,000 tons returning from a world voyage. The "Columbus" compared favourably with the ocean greyhounds which called at Queenstown up to 1912, and the Board and himself were perfectly satisfied now that Cork Harbour was again being recognised even by a German company.

"There is nothing derogatory in the minds of the members or myself towards any particular company or its nationality," said the chairman. "There is no apology due to the White Star or Oceanic Steam Navigation Co. If Mr. Harman thinks I have overstepped my duties here, he is mistaken. I would be happy if Mr. Harman's influence could be exercised so that the Oceanic Steam Navigation Co. would bring ships like the "Majestic" here. It shall never go unchallenged, however, that these British liner companies did, with their eyes open, state in the House of Commons that Cork Harbour was not safe. Cork Harbour, I say, was safe and is safe, and it was to justify that safety that I expressed a welcome to the German liner, and I owe no apology to any liner company."

## Belfast.

## Belfast's Growing Traffic.

Mr. John S. Garrett presided at the meeting of the Belfast Harbour Board on the 2nd June, in the absence of the chairman (Mr. R. E. Herdman).

At the outset Mr. Garrett extended a warm welcome to the Right Hon. H. M. Pollock, who made his first appearance after a long and trying illness. All the members, said the Acting Chairman, were delighted to see Mr. Pollock looking so well and hoped he would be long spared to be with them at their meetings.

Mr. Pollock expressed his gratitude and thanks for the kind words.

The report of the Harbour Master (Captain McIntyre) showed that 314 vessels arrived at the port in the period from the 17th to 31st May, as follows: Coastwise and cross-channel 279, foreign 24, non-trading 11.

The total tonnage of the vessels which arrived from the 1st January to the 31st May was as follows:—Coastwise and cross-channel 1,133,169 tons, an increase of 34,177 tons over the corresponding period last year; foreign 202,756 tons, an increase of 47,337 tons; non-trading 22,644 tons, a decrease of 27,521 tons. Total: 1,368,569 tons, an increase of 53,903 tons.

A report from the Consulting Engineer stated that the final test of the 150-ton hammer head crane had been carried out by Messrs. Harland and Wolff with satisfactory results.

## Kiel Canal Traffic in April, 1931

There was an increase in the traffic passing through the Canal in April compared with the previous month, as follows:—

		No. of Vessels	Net reg. tons
April 1931	...	3,607	1,202,071
March 1931	...	3,371	1,192,000
April 1930	...	3,787	1,400,964

Of the 3,607 vessels using the Canal in the month of April, 1,540 vessels aggregating 1,042,741 net register tons were registered sea-going vessels, comprising:—

1,453 freight and passenger steamers aggregating 1,040,008	Net reg. tons
85 steam tugs	2,560
2 fishing vessels	173
Further—	
1,332 sailing vessels	100,540
89 lighters and barges	27,142
146 pleasure and Government vessels	31,648

The vessels were loaded as follows:—18 with cattle, 91 with timber, 829 with general cargoes, 166 with coal, 538 with grain, 77 with mixed cargo, 56 with stone, 20 with ore, 1,056 empty or in ballast, 53 with iron, 703 with other bulk goods.

**Recent Legal Decisions :****Harbour Authorities and Income Tax**

**W**HERE there is a surplus of revenue over expenditure then, generally speaking, liability to taxation ensues, the purposes to which the surplus may be applied being an irrelevant consideration. Under the Income Tax Acts, in particular, Case VI. Schedule D, "profits or gains" are assessable and as far back as the *Mersey Docks Case* (1883) Lord Chancellor Selbourne interpreted these words on lines which have been followed ever since. "If it could reasonably be contended, he said, that the word 'profits' in these Acts has reference to some advantage which the persons carrying on the concern are to derive from it, it might be said perhaps that the same argument might have been raised upon the word 'gains'; but to my mind it is reasonably plain that the gains of a trade are that which is gained by the trading for whatever purposes it is used, whether it is gained for the benefit of a community or for the benefit of individuals. Whether the benefit is to be obtained by dividends, or whether it is to be obtained by lightening and diminishing public burdens, it is the same." A leading exemption is the collection of rates. The reason for this being in rating the ratepayers are really levying the rate on themselves through their representative body, and as complete accuracy is impossible in budgeting for the future, there is almost bound to be either a surplus or a deficiency, but such surplus is still the money of the ratepayers and cannot be described as profit or gain.

In the recent case of the *Forth Conservancy Board* (1931) the House of Lords declined to extend this principle to a Public Body which was by Statute forced to expend its surplus revenue in the development of docks and harbours. They held that such surplus was "profits or gains" within the principle of the *Mersey Docks Case* above referred to and that they were not on the same footing as the surplus of rates in the case of a local authority. The case is interesting on account of the criticism by Lord Dunedin of the principle, but however much our readers, as extensive users of docks and harbours, may sympathise with his lordship's views, we feel that the legal principle has been too long established to permit of the decision being otherwise, and what is called for is an alteration in the Income Tax Statutes themselves.

His lordship was of opinion that the effect of the judgment would be disastrous to the proper efficiency of the statutory body concerned, and would to a great extent defeat the object for which the Act of Parliament under which it exists was passed. What was the object of the Act? It was to improve the navigation of the Forth and encourage trade, by way of shipping, in that river. In order to effect that object, the statutory body is brought into existence to dredge the river, and from time to time to improve the navigation by means of cuts in the channel, by deepening the water, and by abrasion of the banks.

In order to do these things the body are entitled to levy dues upon vessels using the river. Not a penny of the dues so levied can be employed for any other purpose except only for the necessary expenses of the trust. No one makes a personal profit out of any of the moneys received; but after this judgment more than one-fifth of the money which may at the end of the year have stood at their credit is to be paid over as income tax. The only result will be that the trustees will take care to have as small a surplus as possible, and any saving of money in order to execute any larger work which would have excellent results will obviously be discouraged. "Such result is utterly foreign to the proper idea of an income tax, which is meant to be a levy on what the person who pays would otherwise use for his own purposes, whether of business or enjoyment, and in my view a public body of this sort ought not to be subjected to any such tax."

His lordship was careful to point out that these observations did not go the length of saying that in some cases income tax ought not to be levied on a public body. If, for example, landed property is held by such a body, that fact would not justify what would be the removing from the natural incidence of the tax a subject which, held by anyone else, could give rise to no question. But there is nothing of that sort here. But in this case the only property of the Board was the money raised by dues, and the dues were totally expended on the objects for which the Board was, by Act of Parliament created. "There is no true distinction between this case and the case of any public body raising rates for public service. Yet it is common ground that such rates are not liable to income tax as in those cases it is the ratepayers' own money which has already paid income tax. The same thing might fairly be said in this present case if you view the shipowners who

use the river as a body just as you view the taxpayers as a body. It may be said that a foreign ship might use the Forth, and that that owner has not paid income tax. Equally it may be said that if any hereditament in a town belonged to a foreigner who was not personally present in the country for more than six months, his contribution to the rates would be from money on which he had not paid income tax.

While it was most definitely laid down in the *Mersey Docks* Case that the purpose to which the money collected was applied could not be considered in settling whether it was a gain or profit or not, yet his lordship thought it would have been better to have followed the line of decision, that once it was settled that a sum was a profit or gain the question of how it was employed did not matter, yet it was permissible to look at how it was to be expended in order to judge of the question whether it was a true profit or gain.

The Judgment of the House of Lords in the *Forth Conservancy Case* (*supra*) casts doubt on the decision of Mr. Justice Rowlatt in *Severn Fishery Board v. O'May* (1919) exempting that body from tax. The facts were similar. The Severn Board was a statutory one, invested with the power and duty of protecting the salmon fishings in the river, and to do such acts as they might deem expedient for the protection and improvement of these fishings. Their receipts were derived from fishing licences and fines for offences against the Salmon and Freshwater Fisheries Acts. Rowlatt, J., said: "Now what is the position of this Board? The receipt of money by them has nothing to do with any sort of property, or any sort of undertaking in connection with which the subject of profit could be thought of. They have no property. They have no tolls or any of the other things mentioned in the Act; they have no trade or concern in the nature of trade. They are simply acting as a public body protecting the fisheries for a particular locality in the same way that the Government might protect them, and raising for that purpose a revenue by taking licences from the people who enjoy those fisheries. It is not like a profit-making concern at all. The revenue authorities have treated them as carrying on something analogous to a trade, and as making a profit out of the balance of the receipts over and above the expenses of upkeep. I do not think that is the right view at all. I think they make no profit. As in my view the resulting balance is not a profit, it becomes unnecessary to consider whether the fact that they expended the balance under the statutes in making improvements in the rivers and fish passes relieves them from liability to taxation." That statement would appear to be inconsistent with the decision in the *Mersey Docks Case* in so far as (a) it implies that revenues raised by a public body entrusted with the discharge of a public duty cannot be profits or gains for the purposes of income tax; and (b) it assumes that the purposes to which the revenues are applied can procure relief from taxation which would otherwise be due.

**Port of London Authority****London's Shipping.**

During the week ended May 29th, 891 vessels, representing 888,241 net register tons, used the Port of London; 527 vessels (744,651 net register tons) were to and from Colonial and foreign ports, and 364 (143,590 net register tons) were engaged in coastwise traffic.

\* \* \* \* \*

During the week ended June 5th, 920 vessels, representing 857,411 net register tons, used the Port of London; 534 vessels (686,865 net register tons) were to and from Colonial and foreign ports and 386 (170,546 net register tons) were engaged in coastwise traffic.

\* \* \* \* \*

During the week ended June 12th, 989 vessels, representing 991,565 net register tons, used the Port of London; 570 vessels (839,089 net register tons) were to and from Colonial and foreign ports and 419 (152,476 net register tons) were engaged in coastwise traffic.

\* \* \* \* \*

During the week ended June 19th, 1,141 vessels, representing 931,981 net register tons, used the Port of London; 555 vessels (738,332 net register tons) were to and from Colonial and Foreign Ports, and 586 (193,590 net register tons) were engaged in coastwise traffic.

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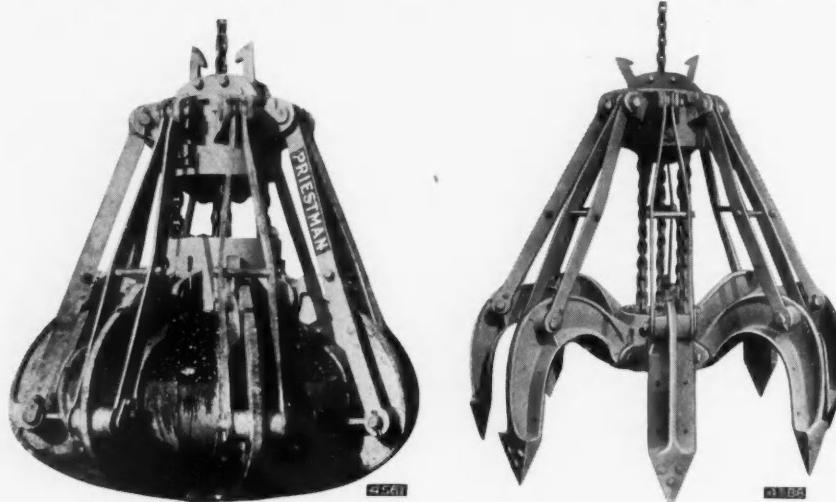
**WM. GOODACRE & SONS, Ltd.**  
RUSSELL ROAD,  
CUSTOM HOUSE, LONDON, E.16

'Phone : Albert Dock 1741-2-3-4. 'Grams : "Goodacre, London."  
Codes : A.B.C. 5th Edition & Bentley's.

## A New Grab

**T**HE wide range of grabs covering a thousand different types and sizes which is made by Messrs. Priestman Brothers, Ltd., Hull, is augmented by a new design—the "Octo"-Grab—which this firm has recently marketed.

The jaws are the distinctive feature comprising, as they do, eight blades, which swing apart as the grab opens, giving the impression of an octopus flinging wide its tentacles; it is this similarity which has given the grab its name.



The "Octo"-Grab.

The whole weight and digging power are concentrated behind the sharp-pointed blades which are driven into the material to be handled. As the grab closes, the blades move together so that in the shut position, the jaws form a complete bowl, and small material as well as large lumps is securely retained without fear of spillage. The grab therefore combines the penetrative power of a Whole Tine Grab with the holding capabilities of a Clamshell Plate Grab. For digging material

which consists entirely of large pieces, the detachable inside plates, which are bolted to the blades, can be removed, thus facilitating the entry of the blades between the lumps and ensuring the lifting of a good load.

The "Octo"-Grab is, consequently, extremely effective where "difficult" work has to be tackled, such as the handling of lumpy ores, scrap, boulders and limestone in large pieces. It is also capable of excavating ground, which no one grab of other characteristics could deal with, as, for example, a mixture of clay and various sized stones, difficult to penetrate, and yet, when excavated, loose enough to escape through the spaces between the tines of a Whole Tine Grab.

The construction of the "Octo"-Grab is of the strongest. The blades comprise ribbed steel castings with wide bosses to provide the maximum amount of lateral rigidity and to give ample bearing surfaces for both the connecting hinge and lever arm pins. The points are in cast manganese steel and are renewable.

The top and centre castings are also in steel, providing ample protection to the grab sheaves, which are so arranged as to eliminate entirely any side lead on the operating chain or rope, thus lengthening enormously its life.

Due to the low centre of gravity the grab squats snugly on the sides of heaps without risk of it falling over, and the compact design allows it to be easily manipulated under the coamings in the case of ship discharging work.

Operation can be by single-line (ring discharge or dumping), double-line, or treble—or four-line dependent upon what best suits the condition of working and the hoisting apparatus—jib crane or overhead traveller—which has to work the grab.

It may be mentioned as a matter of additional interest that one of Messrs. Priestman Brothers' recent orders is for three "Octo"-Grabs for the L.M. and S. Railway, for a new material-discharging quay which is being laid down at Goole.

## Credit Facilities for the Building of New Tonnage for the Russians or for the Purchase of Existing Tonnage

**I**N view of the report circulated in the British press to the effect that a deputation from the Federation of Engineering and Shipbuilding Trades and other British trade unions concerned in the shipbuilding industry was recently received by the British Government with the object of discussing the question of credit facilities for the building of new Russian tonnage, the Baltic and International Maritime Conference has made representations to the British Government against the granting of such facilities.

These representations were based on the resolution concerning this subject which was passed at the Board of Directors meeting of the Conference in May last. It was laid down that measures such as proposed by the deputation would be tantamount to assisting the Russians to compete with shipowners in Great Britain and in other countries, moreover on an unequal footing where similar credit facilities—as is the case in Great Britain—are not available for national shipowners.

Secondly, these measures would tend to add to the already existing surplus of tonnage, which aspect of the matter is so self-evident and so easily ascertainable by the British Government from the condition of shipping in Great Britain that no further proof is needed.

Thirdly, the risk of the fulfilment of the obligations on the part of the Russians in case of the failure of their credit would in reality have to be borne, equally with other taxpayers, by the very shipowners who would also have to bear the brunt of the competition.

When thus emphasising the national view, although British shipowners may be expected to be fully competent to speak for themselves, the Conference had in mind that in these arguments the international view would be identical with the national, but the main reason was that the attitude of the British Government is an all-important factor not only for British shipowners, but for the shipowners of all countries.

In other countries Governments and other parties are watching developments in Great Britain, and the granting of the desired facilities, or even a favourable sign to that effect, will be taken

as a signal for other countries whose shipbuilding is in a like depressed condition to embark on similar schemes.

It should be remembered that this was the result of the application some years ago of the Trade Facilities Act to shipbuilding. Similar credit facilities were granted in other countries which neutralised any gain British shipbuilding might have had from these facilities and was largely responsible for the present surplus of tonnage and the deplorable conditions arising therefrom.

The Conference also called attention to the fact that it is reasonable to presume that the readiness of the British Government to grant credits is by no means identical with the acceptance of such credits by the Russians on British terms. They will no doubt accept the cheapest and most favourable offers, and such offers will not be slow in forthcoming, once the Russians are able to show other countries that in principle they can obtain British vessels, new or second-hand, by means of credit from the British Government.

It may thus be said with certainty that the effect of the British Government giving way to, or even favourably considering, Russian proposals will pave the way for the Russians to obtain what they desire, with the inevitable result that shipowners from all countries, including Great Britain, will suffer. On the other hand, there is no guarantee, as presumed by the deputation, that the British shipbuilding will benefit to any important extent or be revived even temporarily, while in the long run it will suffer along with shipowners if the surplus of tonnage is added to and the prevailing depression prolonged interminably.

The Conference concluded in urging the British Government to give the matter immediate attention and, if possible, to issue an immediate statement concerning its attitude in order to prevent that other Governments relying on reports concerning a favourable attitude on the part of the British Government commit themselves to accept Russian proposals to the detriment of the shipbuilding and shipowning community in Great Britain and elsewhere.



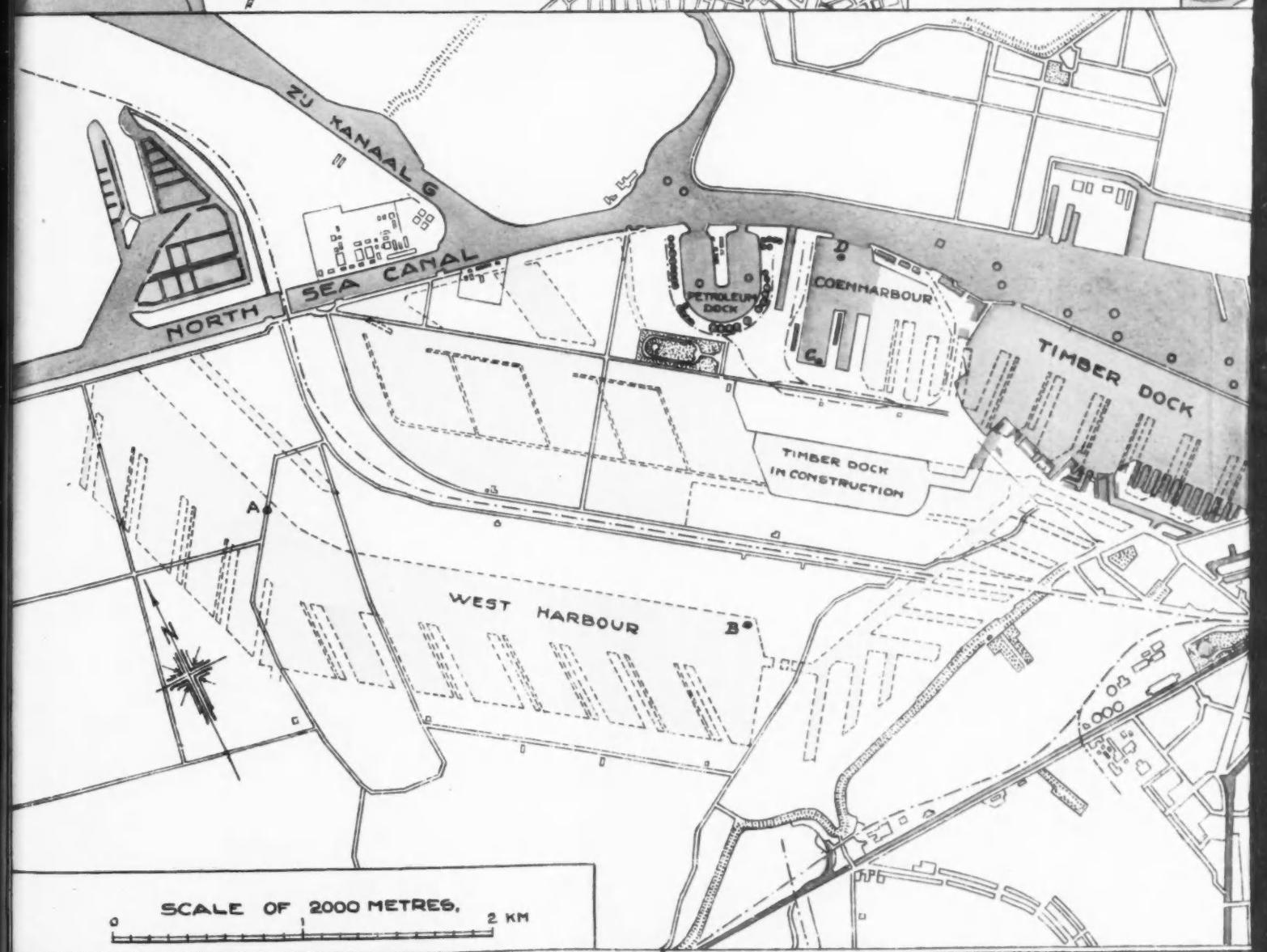
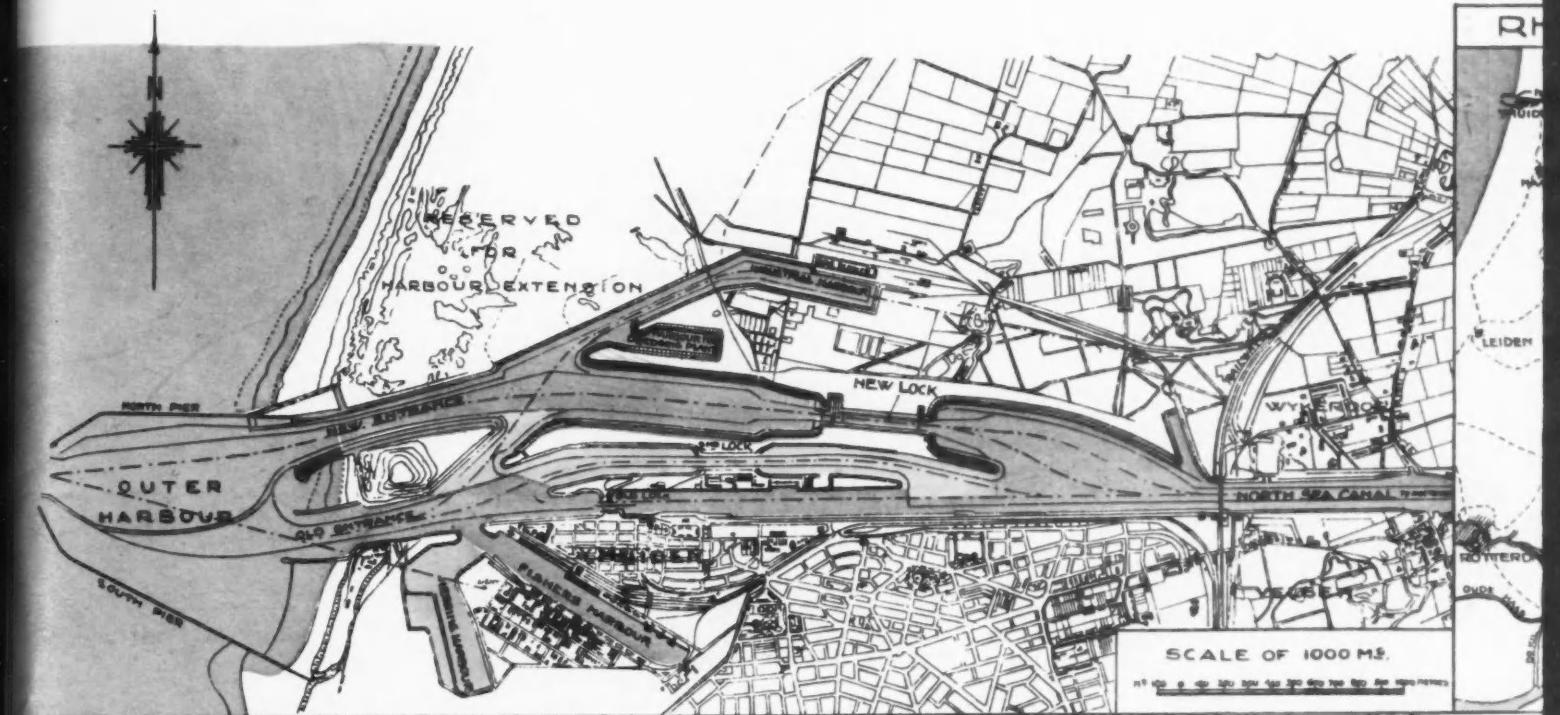


SUPPLEMENT TO THE DOCK AND HAR

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# WORKS DEPARTMENT, AUGUST, 1931.

JURISDICTION OF THE MUNICIPALITY  
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